Visiting Fellowship Program Report

Judicial Productivity and Court Delay: An Exploratory Analysis of the Federal District Courts

National Institute of Law Enforcement and Criminal Justice
Law Enforcement Assistance Administration
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Robert W. Gillespie

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NATIONAL INSTITUTE OF LAW ENFORCEMENT AND CRIMINAL JUSTICE

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ABSTRACT

The purpose of this project was to formulate a measure of court output, based upon case weights, that could be uniformly applied to each of the United States District Courts and could be used to analyze the causes of differential performance among the courts. The statistical method used was multiple regression analysis applied across all of the courts for each year from 1968 to 1974.

The trend in average output per judge over all courts was found to be significantly higher using the output measure than using total cases disposed. Court delay was found to be consistently related to pending workload per judge but only weakly related to output per judge. Output per judge (productivity) was found to be strongly related to demand pressure (total available workload) and size of court, but not significantly related to the differential use of trials. These findings suggest that the courts, on the average, have reserve capacity, and the use of trials in practice is not as significant a factor in limiting court output as is generally believed. The findings also point to some weaknesses in the analytic framework itself; refinements to achieve a more consistent and accurate analysis within the general framework used are suggested.

TABLE OF CONTENTS

TABLES AND CHARTS

FOREWORD

One of the most difficult problems researchers encounter in studying the courts is measuring court performance. Dr. Robert Gillespie, a 1974-75 Visiting Fellow at the National Institute, endeavored to formulate a measure that could be uniformly applied to each Federal District court to provide more exact information about the causes of varied performance rates among the courts.

The findings presented in this report are a beginning in the long-range process of developing a sophisticated statistical conceptualization of court performance. The report as a whole contains valuable information for those who are currently grappling with the problem. It lays important groundwork and points out some directions for future research.

Gerald M. Caplan
Director
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PREFACE

This research was completed while I was a Visiting Fellow at the National Institute of Law Enforcement and Criminal Justice. The financial support of the research by the Institute is gratefully acknowledged, as are the encouragement and stimulating atmosphere provided by the Institute's staff. Important assistance was also provided by the staff of the Administrative Office of the U.S. Courts in supplying unpublished data and clarifying many aspects of their data. Mr. James A. McCafferty was particularly helpful and patient in meeting all requests for assistance. Needless to say, however, responsibility for any errors or other inadequacies in the study is mine alone.

SUMMARY

Analytical Framework

This study adds to the meager stock of empirical knowledge regarding the courts and, in so doing, tests some of the conventional wisdom against this empirical knowledge. Specifically, it analyzes the relation between court delay, court productivity, and the demand for court services among all District Courts, and the determinants of differences in court productivity itself. In so doing, it makes two methodological contributions to the analysis of the courts. The first is the construction of a common measure of the level of demand for court services and of the level of output of court services. The second contribution is the application of the techniques of multivariate statistical inference to the measurement of behavioral relationships among all Federal District Courts. This approach assumes that there exist common modes of behavior among the District Courts, differences notwithstanding, because of their common rules of procedure, common statutes, and unified administration. This assumption is tested using statistical techniques and the rich data resources compiled by the Administrative Office of the United States Courts.

The measure of demand and output utilizes a modified version of the case weights derived by the Federal Judicial Center from its time study of District Court judges.[1] These weights are

modified to reflect the number of judge minutes required to dispose of the average case in each of the approximately 42 classes of cases in which data are published at the District Court level. The weighted sum of cases filed in a District in a year thus constitutes the total demand for case-related judge services in judge hours. Similarly, the weighted case dispositions in a District measure the total output of the District in case-related hours of judge time.

These annual totals of case-related judge hours are converted into "equivalent judge years" by assuming that a full-time judge can supply 1302 case-related hours per twelve months of service. The detailed construction and derivation of these measures are explained in the Appendix. An equivalent judge year is then in part an empirical measure, since both the weights and the case data are empirical, and in part a statistical construct, since the number of case-related judge hours supplied per judge per year is arbitrary, although not implausible; nevertheless, it has great utility in facilitating interpretation of the empirical results.

What is most important at this point is that the interpretation and use of these measures of demand and output in equivalent judge years be clear. To illustrate the demand measure: suppose the weighted case filings during a year in a District Court produced a total sum of 3906 judge hours. Dividing this by 1302 hours happens to produce exactly three equivalent judge years. That is, it would take a single typical judge three years to process all of the cases filed during the year. This measure of

demand may then be directly compared to the actual number of judges assigned to that District. For example, if it were a two-judge court, then we could say that the demand for judge services in this District could be met using only 75% of the available judge resources of the District.

Case terminations measured in equivalent judge years are readily converted into a measure of average judge productivity for each court. For example, if output were four equivalent judge years for a given year and the court had available three full-time judges, the ratio of equivalent judge years of output to judges available produces an average productivity of the judges in this District of 1.33; that is, this court would be producing case-related output at the rate of 1.33 equivalent judge years per actual available judge.

It is important to emphasize that although this measure is referred to as judge productivity, it should not be thought of as measuring the productivity of <u>individual</u> judges. Rather, it is the average productivity of <u>all</u> judges available to that court during a given year. Consequently, we will use the terms judicial productivity and court productivity as synonomous in this study. Further, our measure of the number of judges available to a given court includes not only the regular judges assigned to the court but also the services of senior judges and visiting judges. The procedures used to aggregate these different categories into a single available judge measure are also explained in Appendix A.

Findings

The following are major findings of the statistical analyses. Some of these findings are qualified and elaborated on in the subsequent sections of the paper. These qualifications notwithstanding, the results are considered to be significant and add to our empirical knowledge of the Federal District Court's operating characteristics. The order in which these findings are listed conforms to their order of presentation in the following sections.

1) Judicial productivity in equivalent judge years of output per available judge has, on the average over all districts, increased by 32% between 1968 and 1974. The measure of available judges includes actual senior judge services as well as the services of regular judges. The contribution of senior judges has been a significant fraction -- approximately 10% -- of total available judicial services.

2) The increase in average judicial output has increased faster than the increase in available workload over the period 1968-74; as a consequence, during this same period there has been a decline in the average case processing time of about 6%.

3) The average demand in equivalent judge years per available judge over the period shows a high degree of variability. In each year this measure of "excess demand" shows some courts as low as .4 and other courts as high as 2.0 (Chart 1). The implication of this variability is that judgeships are poorly allocated among districts in terms of the district demand for case-related judicial services.

4) The average output per available judge over the period also shows a high degree of variability among courts. In each year, there are some courts with a judicial output per available judge as low as .4 for some courts, while other courts have an output of over 2.0 (Chart 2). The average productivity over all courts is .98 in 1968 and rises to 1.29 in 1974 (Table 2). The determinants of this variability in productivity are discussed below.

5) In total, the simultaneous effects of productivity and demand differences in District Courts explain only about half of the variation in case processing times (court delay) among districts. This strongly suggests that a complete understanding of differences in court delay among districts will have to incorporate factors that are, strictly speaking, outside the courts.

6) Differences in case processing time among District Courts are explained primarily by the component of demand per available judge derived from the pending caseload at the start of each year. Changes from the prior year in the demand component derived from new case filings per available judge during a year have no significant effect on differences in processing times of cases during that year. Differences in court productivity also contribute to the explanation for differences in processing times of criminal cases but not of civil cases.

7) The results do not, on the average, reflect a strong priority for processing criminal cases at the expense of civil cases. A high pending caseload demand of civil cases and of criminal cases <u>both</u> tend to be associated with longer criminal case processing time. And high pending criminal caseloads have <u>no</u> sta-

tistically significant effect on civil case processing time.

The above two findings regarding the relationship of court delay to court productivity and to the level of demand for court services, however, must be viewed as tentative because of data inadequacies and the very simple model used. Data were available only for total judge time available to each court. It was not possible to determine directly how this total was allocated between criminal and civil case processing activity. Consequently, it was necessary to measure civil and criminal output relative to total available judge time rather than to the amount expended in each type of activity. Thus the measures of criminal and civil productivity measure court resource input allocation decisions only indirectly by using observed outputs. If there are lags between changes in the amount of resources applied to a given type of case processing and the consequent change in output, then this indirect measure will be in error.

Another difficulty with the analysis is the assumption underlying the statistical model that the level of demand for court services is independent of the prevailing processing delay. If this is not true, i.e., if the demand for court services depends, in part, on the current length of delay, then the estimated effects of productivity and level of demand on court delay are biased. A conceptually correct formulation would require court delay to be determined by the simultaneous interaction of the available supply of court services and a demand function that itself depends upon the length of court delay.

8) The most important variable in explaining the differences in productivity shown in Chart 2 is the level of demand pressure experienced by each court. That is, courts showing high levels of productivity per available judge are also experiencing high levels of demand pressure per available judge. This high level of elasticity of court services to demand suggests that the number of case-related hours actually supplied by available judges responds to demand pressure (i.e., judges work harder, longer, or more efficiently when there is a need to do so.) The inability to measure actual judge hours of input rather than just years makes it difficult to isolate statistically and to measure with accuracy the impact on court productivity of innovations, such as the introduction of magistrates.

9) Surprisingly, and counter to expectations, courts that relied more heavily on trials as disposition methods did not also show lower levels of productivity. Either the use of trials was not statistically significant as a factor determining productivity, or the use of trials was significantly and positively related to productivity. This positive relation was most frequently found with civil trials; criminal trials usually had no statistically significant effect on productivity. The one exception to these results appeared when changes in productivity in each court between 1968 and 1974 were related to changes in the independent variables between 1968 and 1974. In this instance civil trials were not significant, but the use of criminal trials was significantly and negatively related to changes in productivity. The magnitude of the depressing effect of increased trial use on productivity

was, however, small.

The above two results regarding differences in court productivity also require qualification because of the two problems discussed above in connection with the determinants of court delay. Because of data limitations, the measures of criminal and civil productivity had to be based upon total judge time available to the court rather than on the time applied to each type of case processing. Further, the results suggest that the use of trials may absorb a great deal of court resources, but that the prompt availability of a trial may operate as a threat to litigants and thus expedite settlements. Consequently, the estimates from the model may be biased, as this potential interaction between the use of trials and speed of settlements was not formally incorporated into the analysis. Indeed, it was the results of the analysis itself that suggested the possibility of such an effect.

The qualifications of the analysis notwithstanding, the findings are in sharp contrast to the widely held view that the continued viability of our court systems is dependent upon the predominance of guilty pleas to dispose of criminal cases.[2] Chief Justice Burger has forcefully stated this view.

> There is another factor. It is elementary, historically and statistically, that systems of courts--the number of judges, prosecutors and courtrooms--have been based on the premise that approximately 90 percent of all defendants will plead guilty leaving only 10 percent, more or less, to be tried. That premise may no longer be a reliable yardstick of our needs. The consequence of what might seem on its face a small percentage change in the rate of guilty pleas can be tremendous. A reduction from 90 percent to 80 percent in guilty pleas requires the assignment of twice the judicial manpower and facilities--judges, court reporters, bailiffs, clerks, jurors and courtrooms. A reduction to 70 percent trebles this demand. [3]

The statistical evidence for the District Courts does not provide the support for this view that one would expect, if the use of trials were in fact as significant a threat to the court system's capacity to process cases as is implied.

CHAPTER I. INTRODUCTION

In the last few years, there has developed a widespread concern regarding the performance of our court systems and a concomitant interest in the modernization of judicial administration as one necessary step to improving this performance. Indicators of court performance most frequently discussed include the average time required to process cases (court delay) and the widespread use of plea bargaining as the primary method used to dispose of criminal cases. The inference that these performance indicators reflect a serious problem is widely accepted, with the result that most of the literature either describes and decries the dimensions of the problem or deals--usually at an impressionistic level--with causes and solutions. There is little agreement, however, on either the causes of the delay or the best solutions.[4]

A review of the literature suggests a variety of causes: archaic procedures, judicially mandated changes in criminal procedures to make "due process" more meticulous and protective of the rights of the accused, lack of court resources to cope with the "litigation explosion," a shortage of trial lawyers, or--in the view of an early researcher in the area--simply a lack of administrative will by the courts themselves.

> Given the triviality of the problem and the importance of solving it, there is something truly sinister about the unwillingness or incapability of some of our courts to fulfill their primary administrative duty. It will not suffice for them, as some have attempted, to point the finger at others, at such alleged culprits as the

> bar or the legislature. The first court that puts before the public a clear, honest accounting of its workload, its capabilities, its needs, and couples it with an unequivocal commitment to remove the backlog is bound to succeed. But where is that court?[5]

Although the state courts have usually been the focus of the criticism, the Federal Courts have not escaped notice.[6] The Chief Justice himself has frequently prodded the Federal Judiciary to improve the workings of the Federal Courts.[7] Congress has also been critical of their performance and has recently legislated time limits for bringing criminal cases to trial. This action, the Speedy Trial Act of 1974 (Public Law 93-619, effective January 3, 1975), is the culmination of several years of effort.[8] This Act did not receive strong support from either the Department of Justice or the Judiciary.

The Federal Courts, moreover, have not been unresponsive to the problems they face nor to the criticism implied by this action of Congress. The last few years have witnessed the introduction of a variety of innovations and the creation of the Federal Judicial Center in 1968 with a mandate to produce the research from which other innovations might follow.[9] Partly in response to the Congressional efforts to legislate speedy trial standards, the Supreme Court promulgated a new rule of procedure, effective October 1, 1972, which required each District Court to formulate a plan for "achieving prompt disposition of criminal cases."[10] While this rule did not impose either mandatory or uniform time limits for trial, most criminal defendants would have their cases disposed of within six months of arraignment if the suggested standards are met.[11]

It is acknowledged by the sponsor of the Bill that meeting the standards imposed by the Speedy Trial Act of 1974 will require additional resources.[12] Further implications for additional court resources can be seen in the recommendation of the National Advisory Commission on Criminal Justice Standards and Goals to abolish plea bargaining by 1978.[13] The use of plea bargaining has emerged as a substitute for trials because of a need to economize on resources.[14]

Given this acknowledged concern regarding performance standards and court resources, it is particularly surprising how little empirical research has been carried out relating court delay to court resources or on the factors affecting court productivity.[15] Senator Ervin has summarized this state of affairs with respect to the Federal District Courts.

> Not only have the courts, prosecutors and defense counsel been unable to remedy delay on their own, but they have also been unable or unwilling to provide a comprehensive explanation for the causes of delay....
>
> This dearth of knowledge about the causes of delay and the possibility that the causes may vary from District to District suggest that we cannot end delay in the Federal Courts by legislating specific criminal justice reforms. We simply cannot legislate away the 'underlying causes of delay' because we do not even know what they are.[16]

Another close observer of the Federal Courts has similarly noted "...there is a dearth of empirical research against which to test the conventional wisdom."[17]

In the following chapters, the demand for court services and court output are the central variables in the analysis. These variables are constructed from weighted case filings and dispositions. The weights are based upon a modified version of the case weights derived by the Federal Judicial Center from its time study of District Court judges.[18] In Chapter II trends in court activity are contrasted using the conventional unweighted case totals and the weighted measures. In Chapter III differences in civil and criminal court delay among the District courts are analyzed using these demand and output variables. Chapter IV explores the determinants of differences in weighted output per judge, interpreted as judicial productivity. Finally, in Chapter IV, the limitations and findings of the study are discussed in terms of needed further research.

CHAPTER II. TRENDS IN COURT ACTIVITY: 1968-74

In describing major trends in court activity, it is customary to focus upon case data, using the total cases filed as a measure of demand for court services and the total cases terminated as a measure of court output. It is generally recognized that such totals of raw case data are only a very rough measure of court activity. First, different types of cases have quite different implications for court resources; second, many civil cases are settled without the need for any court action, apart from clerical processing; finally, even within a given case type there is not a one-to-one correspondence between "events" and "cases." To illustrate, in educational institutions there is a one-to-one conversion between number of applications for admission approved and number of prospective students admitted. There is no such uniform equivalence between bank robberies committed and cleared and bank robbery cases filed. This is because criminal actions are brought against defendants, not events. A single bank robbery may produce one or more cases depending upon the circumstances. Thus two districts with the same number of bank robberies may have a different number of bank robbery cases.[19]

These statistical problems notwithstanding, case data are usually the only type of judicial statistics readily available. In this study, however, adjustments are made to the case data to deal with the first two of these problems. By weighting cases with the judge-time weights, the case data are made commensurable in terms of judicial resource implications; the sums thus derived are then measures of the key court resource--judicial

manpower. To adjust for civil cases which are filed but then subsequently disposed of without court action, these cases are simply omitted from the cases-filed data before the weights are applied.

The use of these weights permits more meaningful comparisons of court activity over time, both within a court and between courts. We now turn to such comparisons.

System Level Activity

Table 1 presents a direct comparison of several measures of court activity at the system or macro level, using both raw case totals and the equivalent judge-years measure. There is a striking difference in the percent increase from 1968 to 1974 between demand measured by cases filed and demand measured by judge-years required to handle those cases. The equivalent judge-year increase is about 50% higher than the cases-filed measure, even though the number of civil cases filed has been reduced by the percent disposed of without court action. A significant difference in the relative rates of growth of civil and criminal cases also emerges from this comparison. Although criminal actions remain a relatively small percentage of District Court activity, the rate of growth over this period has been very high--almost 10% per year--when measured in terms of judicial resources required, as compared to about 3% when measured in terms of case filings. Clearly, the equivalent judge-years measure has quite different manpower planning implications.

A comparison of the rates of growth of the services supplied using the two measures reveals differences similar to the compar-

TABLE 1

U.S. District Courts[1]: Macro Activity Measures, 1968-1974

Services Demanded:

Fiscal Year:	Cases Filed: Criminal	Civil	Total	Equivalent Judge Years: Criminal	Civil	Total
1968	30,363	70,171	100,534	94.2	254.3	348.4
1969	33,223	75,826	109,049	101.2	278.0	379.2
1970	37,757	85,761	123,518	119.3	304.9	424.2
1971	40,821	91,780	132,601	134.0	332.0	466.0
1972	46,372	94,021	140,393	145.6	342.5	488.1
1973	39,770	96,341	136,111	157.8	347.6	505.4
1974	36,913	101,288	138,201	155.3	379.6	534.9
Change 1968-74	22 %	44 %	37 %	65 %	49 %	54 %

Services Supplied:

Fiscal Year:	Cases Terminated: Criminal	Civil	Total	Equivalent Judge Years: Criminal	Civil	Total
1968	29,149	67,581	96,730	91.0	242.0	333.0
1969	30,261	72,067	102,328	91.1	262.7	353.8
1970	34,687	79,227	113,914	107.2	278.9	386.0
1971	37,299	85,377	122,676	120.6	305.2	425.8
1972	45,545	93,456	139,001	145.2	339.2	484.4
1973	40,701	96,309	137,010	168.8	348.0	516.8
1974	38,662	95,509	134,171	159.5	355.1	514.6
Change 1968-74	33 %	41 %	39 %	75 %	47 %	55 %

Judicial Resources:

Fiscal Year:	Judgeships Authorized	Filled	Judges Available[2]	Magistrates Available[3]
1968	337	319.8	340.9	0
1969	337	326.9	347.8	0
1970	337	320.0	338.6	8.0
1971	397	345.7	367.9	32.0
1972	396	378.4	410.2	79.2
1973	396	383.0	419.0	86.3
1974	396	378.0	408.0	98.2
Change 1968-74	18 %	18%	20 %	---

[1]Data are for 90 courts, including the District of Columbia but excluding the Virgin Islands, Canal Zone, and Guam. The 1973 and 1974 data include the newly created Louisiana Middle District.

[2]Available judges includes District judgeships filled adjusted for roving judges, plus net borrowing from the Circuit courts and plus an estimate of Senior Judge services measured in judge years. The method employed to make this estimate is explained in the Appendix.

[3]These are full-time Magistrate positions that were filled during the year.

ison of the services demanded. It is interesting, however, to note the relatively similar rates of growth of demand and supply when using the same measure. We shall return to the close relationship between changes in demand and changes in supply in Chapter IV.

The bottom panel of Table 1 shows the quantities of judicial resources available to the court system over the period. The position of Magistrate was not created, of course, until 1970. The measure of "judges available" is used for the first time in this study. Other studies of judicial resources use either "authorized judgeships" or "authorized judgeships filled," although it is not always made clear which is used. But both measures are incorrect if the objective is to measure productivity of judges. All available judicial inputs should conceptually be used as the base for computing productivity. As a practical matter, if the various measures were numerically similar, it could make little difference in the measures obtained. However, Table 1 reveals that this is not the case. There are signficant differences between the three measures. The most important cause of this difference is the services of senior judges; this is reflected in the difference between judgeships filled and judges available. In some years senior judges' services constituted as much as 10% of the total supply of available judicial resources. This measures senior judge service in terms of actual case-related effort rather than assuming that a senior judgeship filled for one year is equivalent to a regular judgeship filled for one year. Such an equivalence would be wrong because senior judges have essen-

tially complete discretion as to the amount of service they supply. The method used to measure senior judge service in units equivalent to regular judge years is explained in Appendix A.

The number of judges available is used in Table 2 as a basis for measuring available workload and judicial productivity. The productivity measure provides a qualitative check of the methods used to compute the case weights and the equivalent judge-year unit. If the total weighted case output in equivalent judge years is a true measure of judge time expended, then this output measure should be identical to actual number of judge years of case-related input--our measure of available judges. If these two measures were identical, then their ratio would be exactly equal to 1.0. This ratio is, of course, what is shown in Table 2 as Output in Equivalent Judge Years per Available Judge. In 1968 and 1969 it is equal to 0.98, not exactly 1.0, but so close as to provide strong confirmation that we are measuring what we purport to be measuring.[20]

Output in equivalent judge years per available judge is a measure of judicial productivity averaged over all courts. It has increased every year since 1969, but at highly variable annual rates. What is most important is the trend rather than the year-to-year changes. Over the seven-year period, productivity has increased by 32%, or nearly one-third; using unweighted cases disposed per available judge shows an increase of only 16%. One's assessment of productivity increases over the period would be substantially different depending upon which measure was used. A recent review of improvements in District Court productivity

TABLE 2

U.S. District Courts[1]: Workload and Performance Measures

Fiscal Year:	Available Workload per Available Judge:[2] Initial Cases Pending plus New Filings:	Equivalent Judge Years	Annual Change	Output per Available Judge: Cases Terminated	Equivalent Judge Years	Annual Change	Median Case Processing Time (Months) Crim.[3]	Civil[4]
1968	540	1.98	---	291	0.98	---	3.3	12.8
1969	541	1.99	0.5%	289	0.98	0.0%	2.7	12.6
1970	629	2.28	14.6%	332	1.12	14.3%	3.5	11.8
1971	616	2.30	0.9%	324	1.13	0.9%	3.1	10.8
1972	612	2.24	-2.6%	333	1.15	1.8%	3.8	9.9
1973	609	2.30	2.7%	323	1.20	4.3%	4.1	12.5
1974	655	2.53	10.0%	339	1.29	7.5%	3.9	10.6
Change 1968-74	21%	28%	---	16%	32%	---	18%	-17%

[1]Data are for 90 courts, including the District of Columbia but excluding Virgin Islands, Canal Zone, and Guam. The 1973 and 1974 data include the newly created Louisiana Middle District.

[2]Available workload is the weighted sum of cases pending at the start of the year plus new filings during the year.

Available judges includes District judgeships filled adjusted for roving judge services plus net borrowing of District Courts from Circuit Courts plus Senior Judge services measured in judge years. The method employed to make this estimate is explained in the Appendix.

[3]Source: Administrative Office of the U.S. Courts, Annual Report, Table D6 (includes District of Columbia).

[4]Source: Administrative Office of the U.S. Courts Annual Reports, Table C-5 (excludes cases disposed of without court action).

cites an increase of 22% from 1968 to 1973 using case terminations per district judgeship (presumably judgeships authorized, but this is not made clear).[21] The measure of equivalent judge years per available judge for this period gives nearly identical results. This similarity is deceptive, however, because the ratio of unweighted case terminations per authorized judgeship is conceptually flawed both in the numerator and in the denominator; in this instance, these errors just happen to cancel rather then reinforce each other.

Although the increase in output over the period is impressive, court delay may still be increasing if demand for court services is growing even faster. The available workload measure provides a composite index of the total demand. This total is composed of the backlog of cases pending plus the annual inflow of new cases. Either one alone would not be a comprehensive measure of demand or available workload during a given year. Cases pending is too high a measure because undoubtedly many of the cases pending are already partially processed at the start of the year. Similarly, new filings are too high because the processing of many of these will carry over into the following year. Nearly half of the civil cases take longer than a year to complete. As a compromise, the sum of cases pending at the start of the year and new cases filed is used. However, since this is an approximation, it is more accurately referred to as an index rather than an absolute measure.

Like judicial productivity, this index shows a high year-to-year variability including even an absolute decline in 1972. The

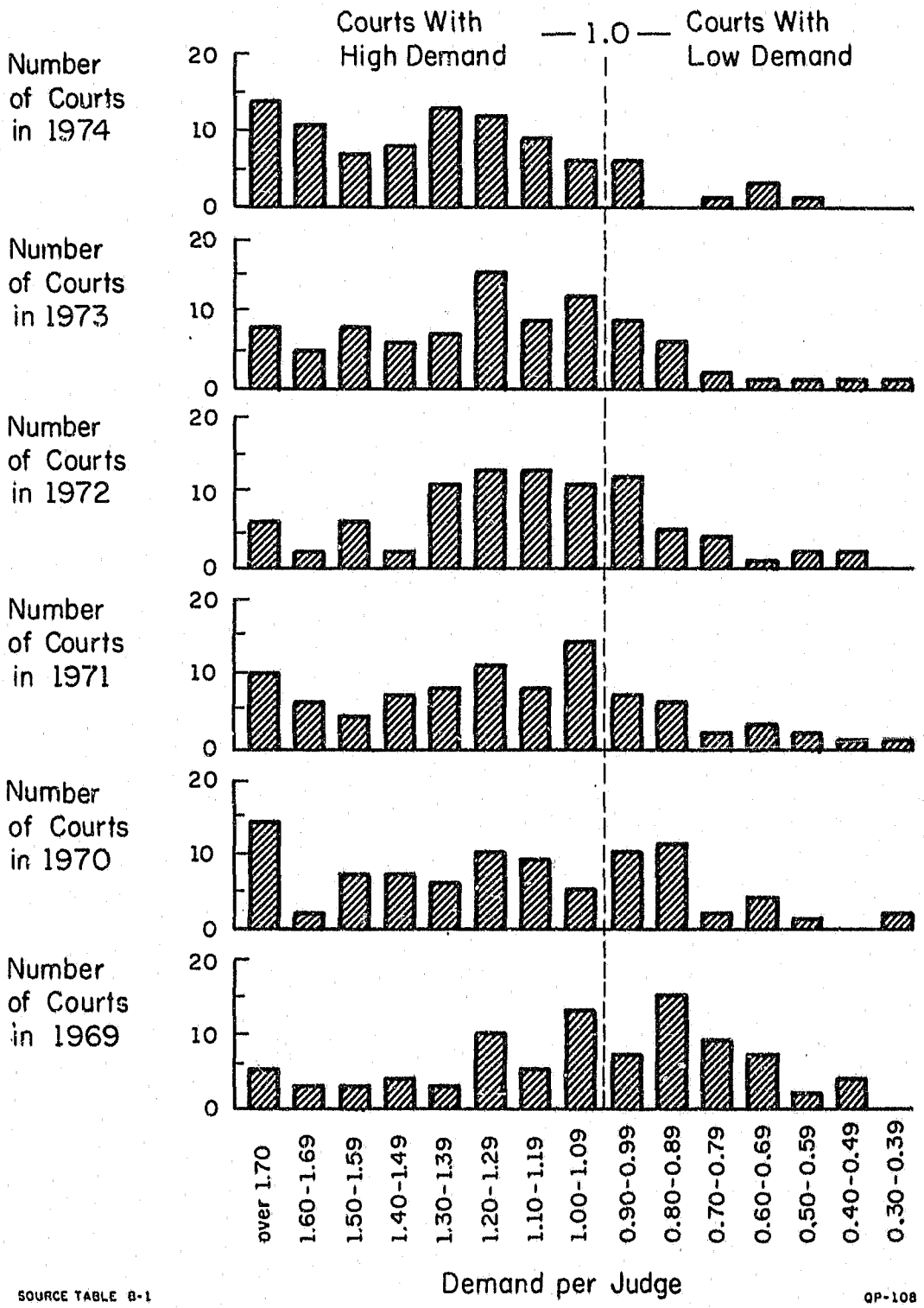
trend over the seven-year period is an increase of 28%, or slightly less than the productivity increase of 32%. These changes indicate that the increase in productivity is running slightly ahead of the increase in workload. The changes in median case processing times may be compared with this result. Although the percentage change in the median time for criminal defendants has actually risen by the same percentage that the civil median time has decreased, if one recognizes that the mix of cases in the Federal Courts is about 30% criminal to 70% civil, a weighted average shows an overall decline in median processing time of about 6%. This improvement is consistent with productivity increasing faster than the available workload index.

District Court Level Activity

As is often the case, average behavior of a group conceals a diversity of behavior of the individual units. While group averages highlight important trends, they offer little scope for explaining the source of these trends. To illustrate this variability as it applies to District Courts, the distribution of demand, in equivalent judge years per available judge, for each court in each year from 1968 to 1974 is in Chart 1, and a similar distribution of output of the courts is given in Chart 2. If each court could dispose of cases using exactly the judge time implied by the case weights, and if judges were made available to each court in precisely the number to provide this judge time, then each court's demand for services per available judge would fall along the 1.0 line in Chart 1. The actual data quickly establish that these conditions are not met; rather, the data re-

CHART 1

Distribution of Demand per Judge in U.S. District Courts: 1969-74



SOURCE TABLE B-1

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veal that the availability of judges diverges substantially from the demand for services as reflected in our measure. Some courts have a consistent excess demand for their services relative to their judicial resources. And,finally, a substantial number fall close to 1.0, or have judicial resources closely balanced with the demand for their services.

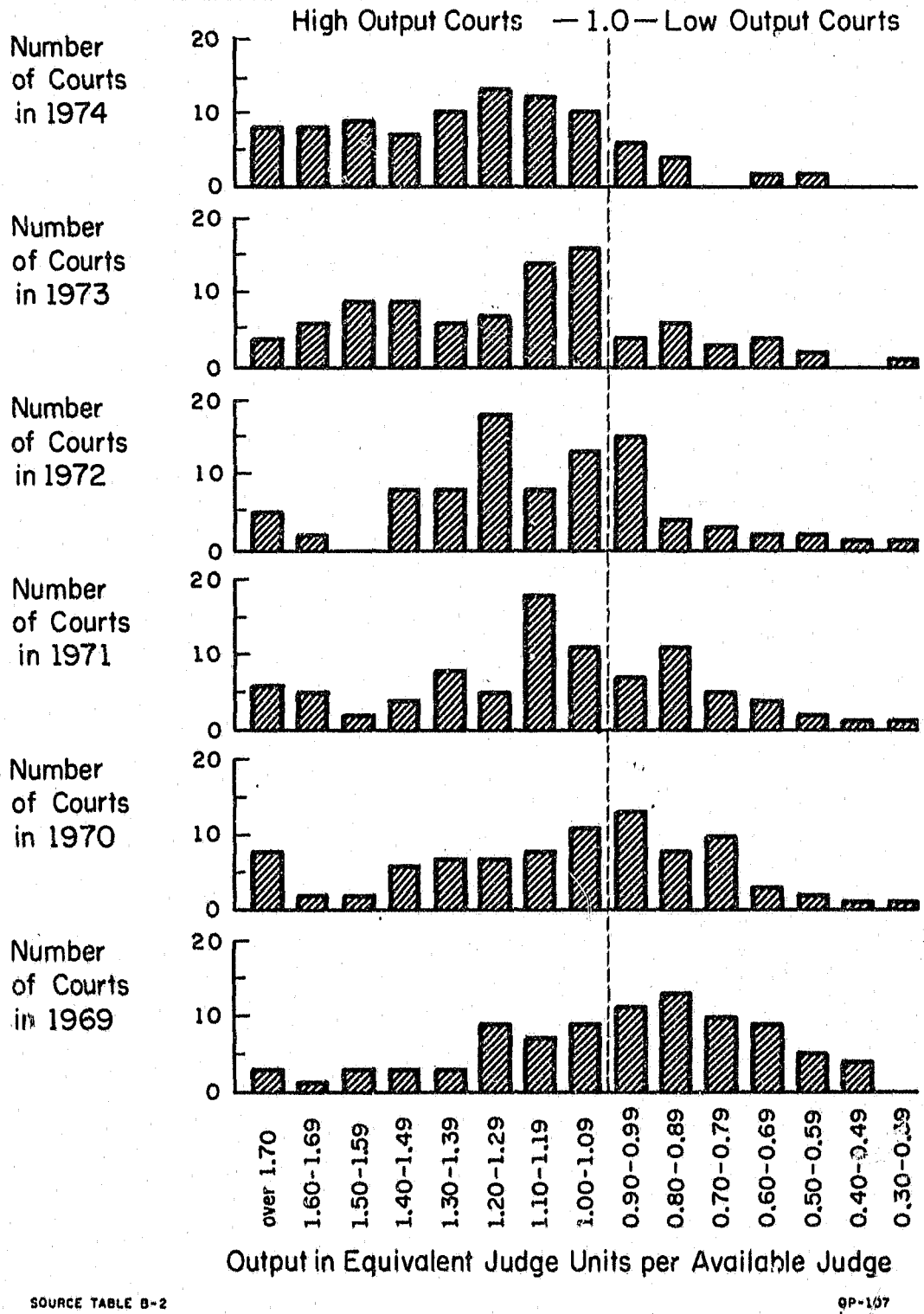
It should be noted, however, that the level of case demand is not the only factor to be considered in judging the appropriate number of judges required. As an example, another factor would be the geographic size of the District. The same level of case demand distributed over Montana would absorb more total judge time than the identical cases spread over Delaware. Other factors may also be relevant, but the development of a theory of judgeship allocation is the subject of another study.

The output of judicial services in Chart 2 shows a wide dispersion similar to that of Chart 1. If (i) the actual average judge time required to dispose of each given type of case were identical in all courts, (ii) if there were sufficient caseload to keep all available judges busy, and finally (iii) if all judges spent the same number of hours per day on case-related activity, then our observed output measure for each court would fall along the 1.0 line in Chart 2. Since this is obviously not the case, one or more of the above assumptions is not met in practice. In Chapter IV, the determinants of this variation in court productivity is systematically explored.

Several interesting points are revealed by Chart 2. First, there are some courts with output per judge consistently and sub-

CHART 2

Distribution of Output per Judge in U.S. District Courts: 1969-74



SOURCE TABLE B-2

GP-107

stantially higher than the average. Conversely, several courts exhibit consistently and substantially lower output per judge than the average. It is noteworthy that the courts exhibiting extreme values of output are the same courts exhibiting extreme values of demand per available judge. For the courts with low values, it appears that assumption (ii) should be questioned. For the courts with high values, assumptions (i) and/or (iii) should be questioned. Finally, many of the courts do cluster around the 1.0 line; for these courts the above assumptions seem to be reasonably met. It further suggests that our absolute measures--judge hours and equivalent judge years--do approximate actual performance.

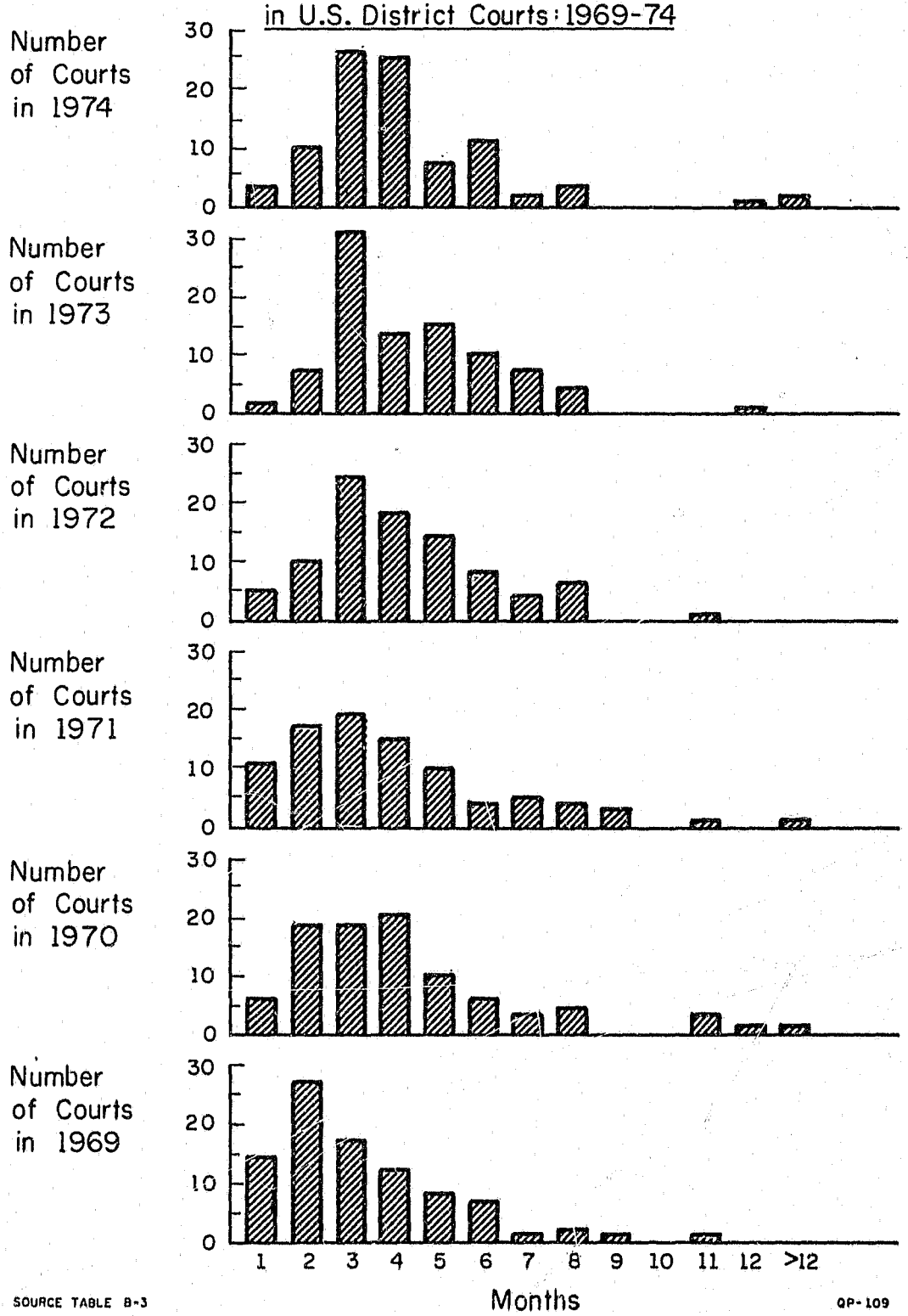
CHAPTER III. COURT DELAY

As was noted earlier, very little empirical work exists on the causes of court delay, and the work that does exist is based upon case studies of specific courts. These studies usually analyze case processing time (court delay) in terms of the various procedural steps and explore the determinants of the delay at each step. Even to collect the data for such a "micro" approach in the ninety District Courts, or even a significant number of them, would require an enormous amount of resources. Therefore, the approach taken here is quite different. The large number of courts can be an advantage as well as a disadvantage if a different methodology is adopted. If these courts are basically similar (e.g., use the same rules of procedure), except with regard to characteristics that can be identified and quantified (such as court size), then multivariate statistical analysis can be used to determine whether differences in characteristics of interest, such as case processing time, are systematically related to differences in these other observable and quantifiable characteristics. Since each court is then represented by only a small set of characteristics, the primary focus being on the court system, this may be called a 'macro' approach. Both the micro and macro approaches have unique advantages and limitations; to advance our knowledge of court behavior both must be used.

In Charts 3 and 4 the distribution of median case processing times of criminal and civil cases for each court is given for each year from 1968 to 1974. The criminal data should be viewed with two points in mind; first, the data are medians, which

CHART 3

Median Criminal Defendant Processing Time in U.S. District Courts: 1969-74

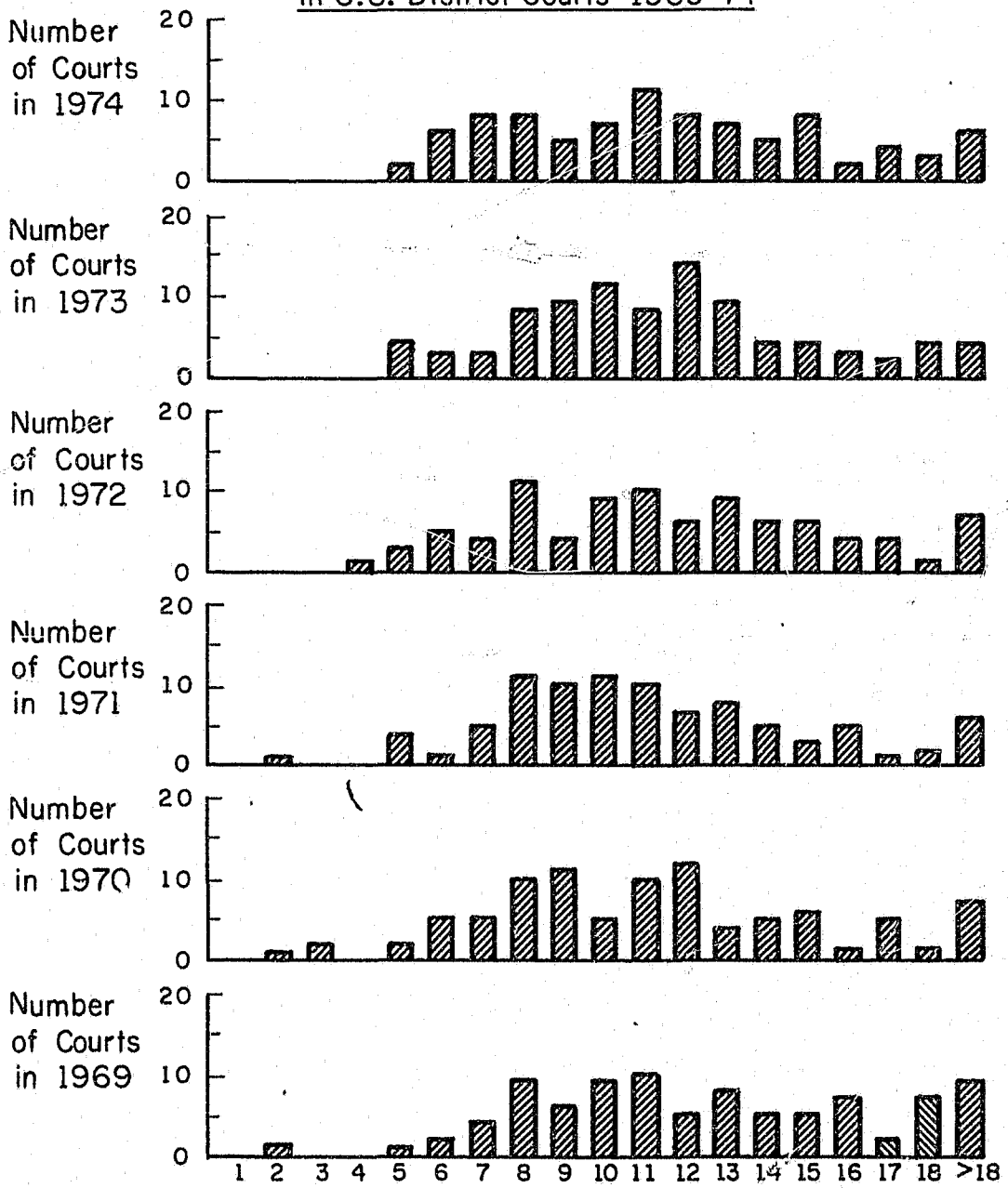


SOURCE TABLE B-3

QP-109

CHART 4

Median Civil Case Processing Time in U.S. District Courts: 1969-74



SOURCE TABLE B-4

QP-110

means that half of the defendants took longer to process than the value shown. Thus, in certain courts over half of the defendants processed had their charges pending over a year. This may be contrasted to the six-month standard that must be achieved within four years under the Speedy Trial Act of 1974 for all but exceptional cases. The second point regarding these data is that no adjustment has been made for delays caused by the defendant being a fugitive; such an adjustment would produce lower values and make these data more meaningful.

The civil data in Chart 4 refer only to those cases which were disposed by court action; cases which were filed but settled without any court action are excluded. Thus all cases included did have some active involvement of the court. The average delay declined from 14.1 months in 1968 to 11.8 months in 1974, but many courts experienced an opposite pattern--a substantial increase in processing time. It is this inter-court difference which the subsequent statistical analysis attempts to explain.

Statistical Model

We have pointed out earlier that court processing time and court productivity are analytically related variables; with given levels of demand and court resources and other factors equal, courts which are more productive would also have shorter processing times. But because other factors are not likely to be equal, the two aspects of court behavior should not in practice be viewed as identical. Strictly speaking, court productivity refers to the effectiveness with which a court can apply its resources to meet

specific requests for service. For example, how much judge time, courtroom time, and juror time is used to conduct the average trial are all aspects of court productivity. A court has primary control over all of these inputs, and thus should be held accountable for their effective utilization.

The average case processing time of courts, however, involves additional factors which are not strictly under the court's control. The most important of these factors is the professional legal inputs: members of the private bar, public defenders, and U.S. Attorneys. Consequently, a properly designed study to explain differences in court delay should include these legal inputs and hypotheses specifying their behavior as well as court behavior. However, to include these other factors, important as they may be, is beyond the scope of this study.

Another important theoretical consideration is the relationship between the demand for court services and the court delay in providing these services. Court delay may be conceived of as a "time price" for court services. This "price," by analogy with the money price of market goods and services, would be appropriately conceptualized as being simultaneously determined by both the supply of court services and the demand for court services. With the level of supply and other factors held constant, one would expect court delay to vary directly with the level of demand. However, the demand for court services itself may reasonably be viewed as being determined, in part, by the length of court delay. For example, excessive court delay could cause potential litigants or prosecutors to find other methods for set-

tling some disputes. Conversely, a court able to process cases very promptly might produce an increase in demand for their services.[22]

To deal adequately with this theoretical simultaneous determination of the level of demand and the length of court delay would require a theory of demand for court services. Such a theory would identify all the variables which determine the level of demand for court services; among these would be, of course, court delay. The formulation of such a theory, however, is beyond the scope of this exploratory study. Consequently, we make the simplifying assumption that the level of demand is independent of the length of court delay. However, it will be noted later, in the discussion of the statistical findings, that this may be a poor assumption.

Differences between courts in criminal and civil case processing time are thus hypothesized to depend primarily upon the level of demand, criminal and civil, experienced by each court relative to the quantity of judicial resources available, and the productivity of these judicial resources. The specific means employed to measure each of these variables and their hypothesized relation with processing time are explained in turn.

Judicial Productivity

The measurement of this variable is complicated by a lack of data on the allocation of available judicial inputs between criminal case processing and civil case processing. Theoretically, one would expect criminal delay to be dependent upon the court's

productivity in criminal cases, and civil delay to be dependent upon the court's productivity in civil cases. However, it is not possible to formulate "true" criminal and civil productivity measures. Although output can be divided into criminal and civil categories, it is not possible to know independent of this output-mix how the available judicial inputs were allocated between these two types of cases. Because of this data limitation, both criminal and civil productivity are measured by the ratio of each type of output to total available judicial inputs.

We hypothesize that, for given levels of demand, the more productive a court is, the lower will be the average processing time.

Demand for Court Services

In each equation, criminal and civil demand are measured separately. Since courts process both types of cases with the same resources, the demand pressure of each class of cases may affect the allocation of court resources between these two classes and thus the processing time. Therefore, both types of case demands are included as independent variables in the criminal delay equation and in the civil delay equation. Further, each demand has two components: cases pending at the start of the year and new cases filed during the year. Both components of demand are measured independently for criminal and civil classes. Thus we have four demand variables in each delay equation.

We have no *a priori* hypotheses as to how each of these demand variables is related to either delay variable, since this relationship will depend upon the internal priorities set by the court in how it allocates its resources to meet these competing demands.

If, for example, the court's judicial resources were completely specialized into "criminal" and "civil" judges, then criminal demand would have no effect on civil case processing time and vice versa. Alternatively, if criminal demand were given absolute priority on court resources, civil delay should be positively related to criminal demand. The heavier the criminal demand, the more court resources would be diverted from civil cases, and thus the longer it would take to process civil cases.

These relationships are formally expressed by the following equation:

$$CRMEDIAN = b_0 + b_1 (CVOEQJ/J) + b_2 (CROEQJ/J) + b_3(CVDEQJ/J) + b_4(CRDEQJ/J) + b_5(CVPEQJ/J) + b_6 (CRPEQJ/J) + e$$

Where: CRMEDIAN = the median time to process criminal defendants from case filing to final case disposition

CVOEQJ/J = civil cases disposed by court action during the current year in equivalent judge years per available judge

CROEQJ/J = criminal cases disposed in equivalent judge years per available judge

CVDEQJ/J = civil cases filed during the year in equivalent judge years less an estimate of cases that will be disposed without court action per available judge

CRDEQJ/J = criminal cases filed during the year in equivalent judgeships per available judge

CVPEQJ/J = civil cases pending at the start of the current

year less an estimate of cases that will be disposed of without court action in equivalent judge years per available judge

CRPEQJ/J = criminal cases pending at the start of the current year in equivalent judge years per available judge

e = the residual effect of all other factors

A similar equation is used for the median civil case processing time, CVMEDIAN.

Statistical Results

The results of estimating the criminal equation are reported in Table 3. The equation explains slightly over half of the variability in criminal processing time among the districts. The pending criminal cases per available judge variable carries most of this explanatory power.

The productivity variables have the anticipated negative sign; i. e., the more productive districts have shorter processing times. Only the criminal productivity, however, is statistically significant for most years. The quantitatively stronger relationship of criminal productivity to criminal delay is to be expected, since it implies that increases in criminal productivity, holding constant civil productivity, will reduce criminal case processing time. But increases in civil productivity, holding constant criminal productivity, will have little effect on criminal processing time. The size of the criminal coefficient is stable until 1973 and 1974. One possible explanation of this change in size is the effect of the introduction of district

TABLE 3

Median Processing Time of Criminal Defendants: Regression Results - Annual Cross-Sections

(t-ratios are shown in parentheses)

Independent Variables	1968	1969	1970	1971	1972	1973	1974
Constant	3.950 (10.07)**	3.825 (8.41)**	3.901 (6.83)**	4.552 (7.09)**	4.465 (7.80)**	4.868 (9.30)**	7.167 (8.41)**
CVOEQJ/J	1.137 (0.65)	0.121 (0.07)	-0.850 (-.47)	-0.017 (-0.01)	-0.622 (-.52)	-0.717 (-.77)	-3.830 (-2.84)**
CROEQJ/J	-3.013 (-0.91)	-8.937 (-2.52)*	-7.798 (-1.95)	-7.385 (-2.03)*	-7.735 (-2.27)*	-4.635 (-2.12)*	-10.559 (-2.85)**
CVDEQJ/J	-2.197 (-1.51)	-1.170 (-0.76)	0.350 (0.23)	-1.586 (-1.29)	-0.787 (-.94)	-1.269 (-1.34)	1.215 (1.43)
CRDEQJ/J	-5.770 (-2.14)*	-2.542 (-0.80)	-2.269 (-.59)	-3.374 (-0.99)	-0.122 (-.04)	-2.158 (-1.20)	1.642 (0.60)
CVPEQJ/J	0.523 (1.04)	1.088 (2.02)*	1.842 (2.87)**	1.917 (3.07)**	1.888 (3.18)**	1.806 (3.42)**	1.108 (2.12)*
CRPEQJ/J	20.16 (9.29)**	19.161 (8.29)**	15.570 (7.81)**	15.179 (7.32)**	9.897 (5.90)**	10.254 (6.50)**	8.952 (3.89)**
Adjusted R^2	.59	.56	.56	.53	.47	.57	.38
Districts	90	90	90	90	90	90	90

* significant at 5% level

** significant at 1% level

plans to insure prompt disposition of criminal cases. If these plans in fact produced a structural change in the operating characteristics of district courts, we would expect this to affect our estimates. The decline in the size of the coefficient in 1973 is consistent with such a structural change--a decrease in criminal delay independent of changes in productivity. The jump in the size of the 1974 coefficient is consistent with a further average decline in criminal delay in spite of the absolute fall in the number of available judges shown in Table 1.

Changes in the level of demand from current case filings per available judge had no significant effect on criminal delay of cases disposed during the current year. The effect of changes in current filings may, however, be delayed until the next year. If so, this will be picked up by the pending caseload.

The pending caseload--both criminal and civil--had significantly positive effects on criminal delay in every year but one. This is consistent with the assumption that there is a resource constraint operating in the courts, but with a lag, and no strong priority in favor of meeting one case demand at the expense of the other. Heavier criminal or civil pending case workloads per available judge result in longer criminal delay when productivity is held constant. The higher quantitative impact of the pending criminal load on criminal delay implies, again, that typically courts give no strong priority to criminal demand at the expense of civil demand.

The results of estimating the civil delay equation, which are reported in Table 4, show an overall level of explanatory power

TABLE 4

Median Processing Time of Civil Cases: Regression Results - Annual Cross-Sections
(t-ratios are shown in parentheses)

Independent Variables:	1968	1969	1970	1971	1972	1973	1974
Constant	15.552 (12.00)**	15.11 (10.94)**	11.681 (9.99)**	14.337 (10.83)**	12.658 (10.82)**	13.173 (12.77)**	14.581 (10.10)**
CVOEQJ/J	-6.328 (-1.09)	-4.661 (-0.92)	9.515 (2.55)*	-2.637 (-.83)	-7.303 (-2.99)**	4.057 (2.20)*	-11.048 (-4.84)**
CROEQJ/J	-12.454 (-1.14)	-7.808 (-0.72)	-22.763 (-2.79)**	7.638 (1.02)	-3.404 (-.49)	-11.616 (-2.70)**	-3.60 (-.57)
CVDEQJ/J	-12.136 (-2.52)*	-15.68 (-3.37)**	-19.364 (-6.23)**	-7.911 (-3.13)**	-4.799 (-2.83)**	-15.021 (-8.06)**	2.880 (2.00)*
CRDEQJ/J	5.150 (0.57)	-3.412 (-0.36)	15.132 (1.92)	-12.867 (-1.83)	-1.362 (-.22)	7.287 (2.06)*	-0.788 (-.17)
CVPEQJ/J	15.656 (9.44)**	17.93 (10.97)**	11.983 (9.12)**	8.578 (6.66)**	12.010 (9.90)**	10.627 (10.20)**	6.272 (7.06)**
CRPEQJ/J	8.068 (1.13)	15.129 (2.16)*	6.787 (1.66)	3.211 (0.75)	1.945 (0.57)	2.582 (0.83)	-0.794 (-.20)
Adjusted R^2	.59	.66	.62	.42	.58	.66	.45
Districts	90	90	90	90	90	90	90

* significant at 5% level

** significant at 1% level

similar to that achieved by the criminal equation; however, the relationships of the individual variables to delay are more mixed. The effect of higher productivity is not uniformly negative; in some years higher court productivity has a significant positive relationship to differences in civil delay, and in other years a significantly negative relationship.

Further, current case filing demand, in contrast to the criminal equation, does show a significant relationship to civil delay; this relationship is negative except for 1974. It is paradoxical that higher current case filings should tend, on the average, to be associated with lower civil delay. We will return to this paradox later.

The pending caseload gives a result similar to that found in the criminal equation: each statistically significant relation is positive with the civil load having a much larger coefficient than the criminal. The impact of the criminal load, however, is statistically significant in only one year.

These mixed results notwithstanding, some patterns do emerge from the analyses. First, the pressure of demand on available resources is a significant determinant of delay, but primarily demand in the form of pending caseload rather than the level of current case filings. Second, higher court productivity is associated with shorter delay in criminal cases, but there is no similar consistent relationship with civil cases. Third, courts do not appear to assign an absolute priority to either civil or criminal cases. This is reflected in the fact that pending caseloads of both types of cases have a positive effect on <u>both</u>

criminal delay and civil delay. If, for example, criminal cases were given a strong priority, one would not expect high civil pending caseloads to be associated with longer delays in processing criminal cases as the results show. But one would expect high criminal pending caseloads to be associated with longer civil delay. The results, however, show no statistically significant association.

Although the results obtained do establish the importance of resource constraints, much is left unexplained. In particular, the erratic effect of productivity on civil delay and the modest overall level of explained variance in all the equations raise important questions regarding the specification of the model. Some reasons for these unsatisfactory results may be conjectured. One problem most certainly is the long lags in processing of civil cases; median processing times of over a year are very common, as is shown in Chart 4. Over half of the civil cases terminated by court action will take more than a year to dispose of. Lags are introduced in the equations only very indirectly via the pending caseload variable. A second source of difficulty may be the existence of feedback effects in the system from court delay to method of settlement. This would seem particularly important in civil cases. A very long delay in achieving settlement by some form of court action leads to more settlements without court action. This possibility is not directly incorporated into the equations, but since the civil equation deals only with cases disposed by court action, such a feedback may have an indirect effect.

As was noted earlier, we assumed that the level of demand for court services was independent of the length of court delay. If there is a simultaneous determination of demand and delay, then the statistical results from the model used will be biased. The erratic results thus point to a need for further theoretical and empirical research on the effect of court delay on the level of demand for court services. Such research could add significantly to our understanding of why delay differs so much between courts.

Finally, an important statistical problem with the analysis is the high correlation between many of the independent variables. This tendency of some variables to move closely together increases the errors of the estimated coefficients, thus reducing their statistical significance. For example, the correlation matrix among these variables, Table B-4 in Appendix B, shows that criminal output and criminal demand were consistently correlated at the .90 level or higher. This multicollinearity no doubt accounts for the instability of the coefficient estimates and their mixed statistical significance from year to year.

CHAPTER IV. DETERMINANTS OF COURT PRODUCTIVITY

As an analytical approach, it is useful to view the District Court system as a publicly-owned, multiplant enterprise producing, on demand, a service--the adjudication of disputes between private parties or between private parties and the state. As with any other enterprise, its capacity to supply the services demanded is dependent upon the amount of inputs at its disposal, the allocation of inputs among the producing units, and the skill and efficiency of management in selecting the best technology and utilizing available resources to the fullest extent possible.

It is the purpose of the analysis in this section to specify and measure the relationships that link differences in productivity--output per unit of input--among the courts to differences in the amounts of selected inputs available, selected differences in "technology," and qualitative differences in output produced; in short, to estimate a simple "production function" applicable to the District Courts. Courts, like other service-producing institutions, present special problems in estimating their production functions. First, the product, or output service, is inherently more difficult to measure than output of physical products. Further complicating this measurement problem, output is not a single service but rather a collection of services--different resolutions of different types of disputes. Fortunately, the use of weighted case terminations offers a workable solution to both of these problems.

One other conceptual aspect of the "product" requires comment. We assume that output is of uniform quality among all

courts and within a given court over time. To illustrate, a criminal case terminated by a negotiated guilty plea is assumed to be identical in quality to a criminal case terminated by jury trial. These two cases may, however, have significantly different implications with regard to the amount of court resources absorbed by each in processing them. Measuring the implications of these different resource requirements on court productivity is the central concern of this analysis.

Other complications arise in specifying and quantifying the relevant inputs. Courts clearly utilize a wide range of inputs, including physical plant--courtrooms and offices--and a variety of specialized personnel to produce court services. To deal with this problem of multiple inputs, we assume that courts utilize a fixed coefficient production function; that is, we assume the key input, judge time, is combined in fixed proportions with the other required inputs. We assume further that the available supply of judge time is more limited than any other input. These are powerful simplifying assumptions since they permit the estimation of a production function by measuring only the judge-time input; the other inputs being assumed present in constant proportions. Nevertheless, these assumptions describe with reasonable accuracy the general organizational pattern of District Courts.

When new judgeships are created, the bundle of supporting inputs (secretary, court reporter, chambers, etc.) are also provided in fixed proportions to the new judgeships. Further, under the individual calendaring system, each judge operates for the most part independently of other judges; consequently, there is no direct interdependence between judges in the production process.

Statistical Model

The dependent variable is average judge productivity, or, alternatively, average annual output per judge, in each District Court. This variable, which is plotted in Chart 2, shows a considerable variation among the courts. It is the purpose of this model to account for as much of this variation as possible with the following specific characteristics of each court in a multiple regression equation.

Size. One obvious difference between District Courts is size. Table 5 gives the size distribution of the courts in the sample for 1968 and 1974 using the number of authorized judges as the size measure; although over 70% of the courts in 1968 (70% in 1974) have fewer than five judges, the remainder of the courts are distributed over a much wider range of sizes.

In other production activities, the existence of economies or dis-economies of scale can significantly affect productivity. As size increases, opportunities for greater specialization arise and the effect of indivisibility of certain inputs has less of an impact. For example, if judges can be added to courts only in whole units, this will affect the average productivity more in small courts than in large. If a small court needs slightly more than one judge, then adding a second judge will reduce average productivity to almost one-half the prior figure until the amount of court business grows sufficiently to fully utilize the second judge. In contrast, if a court has ten judges, and needs slightly more than ten judges, then adding the eleventh will reduce average productivity by only about 10% even if the eleventh is initially completely idle.

TABLE 5

Distribution of District Courts by Number of Authorized Judges

Number of Authorized Judges	Number in 1968	Cumulative Percent	Number in 1974	Cumulative Percent
1 - 1.9	15	17 %	12	13 %
2 - 2.9	32	52 %	26	42 %
3 - 3.9	15	69 %	18	62 %
4 - 4.9	9	79 %	10	73 %
5 - 5.9	5	84 %	5	79 %
6 - 6.9	1	85 %	5	84 %
7 - 7.9	2	87 %	2	87 %
8 - 8.9	5	93 %	2	89 %
9 - 9.9	1	94 %	3	92 %
10 -10.9			2	94 %
11 -11.9	1	96 %	1	96 %
12 -12.9				
13 -13.9	1	97 %	1	97 %
14 -14.9	1	98 %		
15 -15.9	1	99 %	1	98 %
16 -16.9			1	99 %
17 -17.9				
18 -18.9				
19 -19.9			1	99 %
20 -20.9				
.				
.				
.				
24 -24.9	1	100 %		
.				
.				
.				
27 -27.9			1	100 %
Total Courts[1]	90		91	

[1]Includes the District of Columbia, but excludes Virgin Islands, Canal Zone, and Guam

Size can also create the need for more administrative effort to coordinate the increased inputs. If the required administrative inputs grow faster than case-related inputs, this can reduce productivity as size increases. The forces generating economies of scale may, of course, be just balanced with those generating dis-economies of scale, resulting in no net change in productivity from changes in size. Consequently, there is no theoretical basis for predicting the effect of court size on court productivity; it is an empirical matter.

Demand Pressure. If each court (judge) had a well-defined "capacity output," and if demand were always at or above this capacity, then further increases in demand would not be expected to affect output and productivity. Neither of these assumptions, however, seems uniformly applicable over all courts for all years in the study. The excess demand data showed that some courts frequently had underutilized capacity. Further, the concept of "capacity" as applied to courts and to most other production units is not a precisely defined level of output that is reached when some key input--such as physical plant or judges--is fixed. Rather, it is more reasonably thought of as a range of output over which the ability of the production unit to meet additional demand declines rapidly. In a market environment, an increase in output to capacity would result in a sharp rise in unit costs.

Our objective is to measure sources of differential productivity among courts which are all close to capacity. To allow for the existence of idle resources and the bias in results that this would cause, a measure of demand pressure is introduced. This

variable is the available workload in equivalent judge years per available judge in each court. Available workload is constructed by weighting the sum of cases pending at the start of a given year and the cases filed during the year. If all courts were at capacity, this variable would have little impact on output and productivity. However, if idle resources were present in most courts, an increase in available workload, or demand pressure, would be positively related to output and "productivity" as we measure it. An increase in output through utilizing idle resources should not be confused with an increase in true productivity; we seek to measure the determinants of the latter.

Use of Trials. Our measure of output assigns a fixed weight of judge hours to all cases of each type terminated regardless of the method of termination. Terminating a case by trial may be expected, of course, to command more judge time than disposition at a pre-trial stage. The widespread use of plea bargaining in criminal cases is attributed to the lack of resources necessary to use trials for any but a small percentage of cases. To the extent that the use of trials differs between courts or within any court over time, this should produce differences in court productivity as we have measured it.

To test this impact of trials on productivity, two measures of the use of trials were introduced. The first measure was the percent of criminal defendants whose cases were terminated by trial plus the percent of civil cases terminated by trial among all civil cases terminated by some form of court action. Civil cases settled without any court action were excluded. Because

the civil/criminal mix of cases also differs significantly among courts, these percents were each weighted by the respective proportions of civil output and criminal output of the court in question. To use the percents without weights would imply that the same effect on overall productivity would exist for a court terminating two criminal cases--one by trial--and a court terminating 1,000 criminal cases--500 by trial. The weighting thus adjusts for such differences in resource implications when the percentage use of trials is the same.

The second measure of trial activity was the average number of trial days reported by the judges in each court. If trials, on the average, absorb significant amounts of court resources, then both the weighted trial termination percentages and the trial days per judge should be negatively related to court productivity.

Civil/Criminal Case Mix. Although the case weights are expected to allow for the effect of differing case mixes among courts, the criminal/civil case mix is also introduced to see if civil or criminal cases as a group also affect productivity. Such an effect may result if economies of scale operate differently for civil cases than criminal cases or if there exist factors uniquely related to either of the two classes of cases. One such factor is the administrative requirement that District Courts give priority to the processing of criminal cases.

Indigent Criminal Defendants. During the last few years the right of indigent criminal defendants to have counsel has become

mandatory. Further, this requirement has led to the establishment of Federal Public Defender organizations in many Districts. This variable is introduced to explore the possible impact of the type of counsel on judge productivity.

Places of Holding Court. A great many District Courts hold court in several places within their districts. We hypothesize that this geographic dispersion of court activity will reduce productivity because of the loss of judge time spent traveling and because the geographic dispersion of court resources would operate against economies of scale. Consequently, we expect a negative association between productivity and the number of places where court is held.

Magistrates. One of the recent innovations in the District Courts specifically designed to increase productivity is the creation of the position of Federal Magistrate. The magistrates not only replaced the Commissioners, but the position was delegated considerably expanded authority over the range of court business they could conduct. By conducting preliminary hearings and other such procedures, the magistrates free District Court judges to concentrate on the subsequent phases of case activity. To measure the impact of magistrates on court productivity, the number of full-time magistrates per available judge is introduced as a variable for each year since 1970, when the first magistrates were appointed.

Statistical Results

It was necessary, because of data availability, to formulate several equations which differed slightly. The analysis of the results obtained from these original equations suggested further analysis using only selected courts. We have two alternative ways of measuring trial activity, and each of these two equations is estimated both with the magistrate variable and without this variable, since it did not exist prior to 1970. This gives four equations to be estimated. The court samples include annual cross-sections of all courts, pooled samples of several years' data, and selected groups of courts. To facilitate the interpretation of the results we shall consider the basic equation to be the following:

The basic data are annual observations by District Court.

$$(1) \quad \frac{OEQJ}{JAVAIL} = b_0 + b_1\,(JAVAIL) + b_2\,(JAVAIL)^2 + b_3\,(WEQJ/JAVAIL) + b_4\,(CV\%\ TRWTD) + b_5\,(CR\%\ TRWTD) + b_6\,(\%\ DEFWAC) + b_7\,(\#PLHLDCT) + e$$

Where: $\frac{OEQJ}{JAVAIL}$ = average output in equivalent judge years per available judge in each court

JAVAIL = the number of judge years available to each court for each year

$(JAVAIL)^2$ = the square of JAVAIL

(WEQJ/JAVAIL) = the available workload per available judge, to be interpreted as an index of demand pressure on each court

CV% TRWTD = number of civil cases disposed by trial as a percent of all civil cases disposed by court action; this trial percentage weighted by the proportion of civil output to total court

output.

CR% TRWTD = number of criminal defendants whose cases were terminated by trial as a percent of all criminal defendants whose cases were terminated; this trial percentage weighted by the proportion of criminal output to total court output.

% DEFWAC = percent of criminal defendants whose cases were terminated with assigned counsel

PLHLDCT = the number of locations where court was held in each District

e = the residual effect produced by all other factors

Equation (2) adds the number of magistrates per available judge, MAG/JAV, to the other variables in equation (1). Equation (3) replaces the two weighted trial percentages in equation (1) with the number of trial days reported per available judge, TRD/JAV. Finally, equation (4) adds the magistrate variable to equation (3).

Table 6 contains the estimates of equations (1) and (2) using annual cross-section data for each year from 1968 to 1974. In each year, over sixty percent of the court-to-court variation in output is explained by the characteristics of each court that we have measured, ranging from a high of 86% to a low of 61%.

Two variables measuring linear and non-linear economies of scale as measured by number of judges give mixed results; the linear term is significant and positive for three of the years and the non-linear term is significant and negative for the same three years. This implies that factors producing economies of scale initially dominate, but as scale continues to increase, factors producing dis-economies of scale ultimately dominate. This crossover point was at 19, 16, and 21 judges, respectively, in 1970, 71, and 72 in equation (1).

TABLE 6

Average Judicial Productivity: Annual Cross-Section Estimates
(t-ratios shown in parentheses)

Independent Variables:	Eq. (1) 1968	Eq. (1) 1969	Eq. (1) 1970	Eq. (1) 1971
Constant	.09159 (0.44)	.30265 (1.51)	.20728 (1.12)	-.11157 (-.60)
JUDAVAIL	-.00649 (-.53)	.01235 (0.87)	.03307 (2.61)*	.03394 (2.46)*
JUDAV**2	-.00018 (-.32)	-.00111 (-1.57)	-.00171 (-2.86)**	-.00208 (-2.81)**
WEQJ/JAV	.42457 (20.37)**	.41875 (16.64)**	.43069 (20.79)**	.45300 (17.28)**
CV%TRWTD	.00039 (0.20)	.00060 (0.32)	.00420 (2.10)*	.00590 (2.50)*
CR%TRWTD	.01075 (1.39)	.00430 (0.55)	.00136 (0.18)	.00752 (1.05)
TRD/JAV	------	------	------	------
CVEQ/TEQ	-.16123 (-.84)	-.45951 (-2.45)*	-.60781 (-3.40)**	-.40750 (-2.21)*
%DEFWAC	.00149 (1.23)	.00124 (0.99)	.00208 (1.82)	.00362 (2.76)**
PLHLDCT	.02344 (2.12)*	.02584 (2.35)*	.03323 (3.09)**	.03879 (3.26)**
MAG/JAV	------	------	------	------
Adjusted R^2	.84	.79	.86	.79
Districts	90	90	90	90

* significant at the 5 % level

** significant at the 1 % level

TABLE 6 (Continued)

Average Judicial Productivity: Annual Cross-Section Estimates
(t-ratios shown in parentheses)

Independent Variables:	Eq. (1) 1972	Eq. (1) 1973	Eq. (1) 1974
Constant	.34270 (1.52)	.08687 (0.36)	.37551 (1.64)
JUDAVAIL	.04173 (3.01)**	.00878 (0.67)	.00253 (0.20)
JUDAV**2	-.00205 (-3.02)**	.000002 (0.00)	.00001 (0.03)
WEQJ/JAV	.39385 (13.19)**	.38033 (11.62)**	.32956 (11.42)**
CV%TRWTD	.00731 (2.48)*	.00577 (1.51)	.00125 (0.31)
CR%TRWTD	-.00212 (-.21)	-.00020 (-.02)	.01166 (1.00)
TRD/JAV	------	------	------
CVEQ/TEQ	-.60967 (-2.79)**	-.22554 (-.85)	-.18315 (-.70)
%DEFWAC	.00150 (0.90)	.00359 (2.04)*	-.00018 (-.11)
PLHLDCT	.02332 (1.81)	.03776 (2.70)**	.04323 (3.04)**
MAG/JAV	------	------	------
Adjusted R^2	.69	.62	.61
Districts	90	91	91

* significant at the 5 % level

** significant at the 1 % level

TABLE 6 (Continued)

Average Judicial Productivity: Annual Cross-Section Estimates
(t-ratios shown in parentheses)

Independent Variables:	Eq. (2) 1970	Eq. (2) 1971	Eq. (2) 1972	Eq. (2) 1973	Eq. (2) 1974
Constant	.22748 (1.22)	-.09424 (-.50)	.37736 (1.67)	.09419 (0.39)	.36830 (1.72)
JUDAVAIL	.02995 (2.30)*	.02958 (2.02)*	.03810 (2.69)**	.00780 (0.57)	-.00300 (-.25)
JUDAV**2	-.00158 (-2.58)*	-.00185 (-2.37)*	-.00190 (-2.75)**	.00003 (0.06)	.00021 (0.41)
WEQJ/JAV	.42694 (20.31)**	.44437 (15.96)**	.38362 (12.39)**	.37770 (11.00)**	.30033 (10.61)**
CV%TRWTD	.00391 (1.94)	.00574 (2.43)*	.00724 (2.46)*	.00587 (1.52)	.00140 (0.38)
CR%TRWTD	.00004 (.006)	.00673 (0.93)	-.00329 (-.33)	-.00056 (-.06)	.01125 (1.03)
TRD/JAV	------	------	------	------	------
CVEQ/TEQ	-.58999 (-3.28)**	-.39107 (-2.11)*	-.61050 (-2.81)**	-.22363 (-.84)	-.11378 (-.46)
%DEFWAC	.00187 (1.60)	.00347 (2.63)*	.00128 (0.77)	.00347 (1.90)	-.00122 (-.79)
PLHLDCT	.03384 (3.14)**	.03947 (3.30)**	.02143 (1.65)	.03784 (2.69)**	.05022 (3.73)**
MAG/JAV	.23470 (1.03)	.16778 (0.92)	.12315 (1.20)	.03457 (0.26)	.33106 (3.52)**
Adjusted R^2	.86	.79	.69	.62	.66
Districts	90	90	90	91	91

* significant at the 5 % level

** significant at the 1 % level

As one would expect, the variables measuring linear and non-linear economies of scale are highly correlated as the non-linear term is simply the squared value of the linear term. The correlation matrix, TABLE B - 6 in Appendix B, shows the correlation to be over .92 for every year. This accounts, in part, for the year-to-year variation in the values of the estimated coefficients and the fact that the coefficients are not always statistically significant.

The demand pressure index was positive and strongly significant in all of the years. It is so significant as to imply that most of the explanatory power of the equation is contributed by this factor. Surprisingly, the use of trials had little effect on court productivity. Criminal trials were never significant and the use of trials in civil cases had a significantly positive relation to productivity. These results are quite counter to expectations which predicted that courts which used trials more than average would--other things equal--experience lower productivity. The use of trials in criminal cases had no effect on productivity and the use of trials in civil cases tended to be positively related to court productivity. A possible explanation for the lack of influence of criminal trials is the relatively small amount of criminal business conducted in the average District Court. The average size of criminal trial weight is only about 30%, with many courts having an even lower figure. The positive relation of civil trials with productivity is more difficult to understand. One explanation, which at this point is only a conjecture, is that when the judges in a court use trials as a matter of course rather than

the exception, this imposes a pressure on attorneys to settle quickly if they feel their case is weak. If the pressure of a trial were not there, attorneys might be inclined to stretch out negotiations. A court with lengthy procrastination of most cases, but few ultimately going to trial, could absorb more total judge time than a court having more cases going to trial but with the pretrial settlements being achieved quickly and with little expenditure of judge time. Such a pattern is consistent with our findings of a positive association between average judge output and percent of cases disposed by trial.[23]

The findings of the analysis once again point to the interaction between demand for court services and court activity as a potential cause of findings which were counter to expectations. In the previous chapter this interaction was discussed in terms of court delay and the effect this might have on demand. The unexpected effects of trials on court productivity reinforce the earlier discussion. The failure of the model to deal with the behavioral determinants of the demand for court services appears to be a major theoretical shortcoming. Future research should give priority to dealing with this omission.

The ratio measuring the percent of civil output to total output had a significant coefficient in four of the years and was negative every year; however, there was no a priori prediction as to the sign of this variable. A possible explanation of the negative relation with productivity is that there are "economies" which differ between civil and criminal cases which are operative regardless of the size of court as we have measured it--number of judges. These economies may be found outside the court, in the bar. Civil

cases draw more heavily upon attorneys in private practice than do criminal cases. U.S. attorneys are involved in civil cases where the U.S. Government is a party, but these are only about twenty-five percent of all civil cases. Further, many criminal defendants are represented by full-time public defenders rather than private attorneys. Thus, if private attorneys are in short supply, this could result in longer processing times for civil cases and thus appear in our data as a reduction in court productivity. The role of this case-mix variable on productivity clearly requires further analysis.

The percent of criminal defendants who were indigent and received assigned counsel was significantly positive in two years and positive in four other years. These results are quite plausible since they imply that defendants with their own counsel absorb more court resources than defendants represented by assigned counsel. The quantitative impact is not large, however; a rise in the percent of defendants with assigned counsel by 10 percentage points would increase average judge productivity by about 3%.

The last independent variable in equation (1), the number of places of holding court, was positive in every year and significantly so in six of the seven years. This positive relationship is opposite to the hypothesized direction of effect. The results imply that District Courts holding courts in numerous locations are more productive, other things equal, than courts which operate in only one location. We shall return to discuss this result and some of the other results that were counter to expectations after the estimates of the other equations are discussed.

Table 6 also gives the results of cross-section estimates for 1970 to 1974 of equation (2), which includes the variable of magistrates per available judge. The effect of adding this variable on the estimates of other coefficients compared to equation (1) was essentially nil, as was the effect on the overall explanatory power of the equation. This can be explained in large part by the relatively small numbers of magistrates during the early part of the period and perhaps by a lag while the courts adjusted to this change in technology. Indeed, the magistrates had no significant impact on judicial productivity in the estimates until 1974. In 1974 this impact was highly significant as well as quantitatively large. The coefficient implies that doubling the ratio of magistrates to available judges--e.g., increasing the number of magistrates from the approximately one for every four judges in 1974 to two for every four judges--would raise average judge productivity by about 33%. Although this estimate is based upon only one year's data, it shows the impressive impact on court productivity of this innovation.

Table 7 provides the results from estimating the two equations just reviewed but with pooled samples and also estimates of equation (3) using these samples. An alternative method of measuring the use of trials was introduced to check the unexpected results obtained from using the weighted percent use of trials. The Administrative Office of the U.S. Courts employs a statistical construct "trial days" to measure trial activity. Under this construct a trial activity is "a contested proceeding before either a court or a jury in which evidence is introduced." A "trial day" is five and a half hours of judge time expended in such contested proceedings.[24] The

TABLE 7

Average Judicial Productivity: Pooled Cross-Section Estimates
(t-ratios shown in parentheses)

Independent Variables:	EQ. (1) Pooled 1968-74	EQ. (3) Pooled 1968-74	EQ. (1) Pooled 1970-74	EQ. (2) Pooled 1970-74
Constant	.25020 (3.18)**	.22487 (3.31)**	.28044 (2.96)**	.28551 (3.07)**
JUDAVAIL	.01275 (2.59)*	.00497 (1.04)	.01624 (2.80)**	.01157 (1.99)
JUDAV**2	-.00059 (-2.61)*	-.00032 (-1.44)	-.00061 (-2.26)*	-.00042 (-1.56)
WEQJ/JAV	.40483 (42.54)**	.37732 (39.17)**	.39534 (32.36)**	.38388 (31.13)**
CV%TRWTD	.00187 (2.03)*	------	.00368 (2.89)**	.00395 (3.15)**
CR%TRWTD	.00554 (1.74)	------	.00330 (0.84)	.00188 (0.48)
TRD/JAV	------	.00182 (5.98)**	------	------
CVEQ/TEQ	-.40907 (-5.22)**	-.40272 (-6.57)**	-.46409 (-4.76)**	-.43675 (-4.55)**
%DEFWAC	.00131 (2.47)*	.00137 (2.69)**	.00141 (2.14)*	.00122 (1.88)
PLHLDCT	.03458 (7.41)**	.04147 (8.88)**	.03710 (6.43)*	.03744 (6.60)**
MAG/JAV	------	------	------	.19900 (4.08)**
Adjusted R^2	.76	.77	.72	.73
Districts	632	632	452	452

* significant at the 5 % level

** significant at the 1 % level

total number of trial days is reported by each judge; thus, an alternative measure of trial activity is the number of trial days per available judge in each District Court. In equation (3) this measure replaces the weighted trial disposition percentages. A direct comparison of these alternative measures using pooled data is given in Table 7. Trial days also shows a significant positive relationship with court productivity. However, trial days may be interpreted not only as a measure of trial activity but also as a measure of case-related judge time input. The coefficient will not only pick up trial activity but may also reflect differences among courts in judge hours per calendar day. This could explain why the scale measures are not significant when the trial-days variable is introduced.

The other two equations reported in Table 7 are designed to show the average impact of magistrates on productivity since their introduction in 1970. The effect on the total explanatory power of the equation is negligible, but the effect is significantly positive and the size of the coefficient is relatively large. The coefficient is approximately .20. This implies that doubling the number of magistrates will increase average judge productivity by about 20% and thus increase total output by the same amount. However, this is probably a lower limit to the actual impact, as this is an average result over a period of rapid diffusion of this innovation. As was noted above, the coefficient estimated from 1974 alone, the most recent year, is .33. This value implies that a 33% increase in total court output could be achieved either directly by increasing the total number of judges by 33% or doubling the number of magistrates and raising output

via higher judge productivity. This interpretation of the quantitative effect of such large changes must be viewed as very rough; however, either estimate shows that the introduction of magistrates has clearly had more than a trivial impact on judicial productivity.

Results from several variables in analyses have been noted individually as surprising either because of their magnitude or because they are opposite in sign to theoretical expectations. However, a unifying interpretation of these individual results is possible. The results in question show the strong influence of the demand pressure variable on productivity, and the positive relationships between productivity and the use of trials and the number of places of holding court.

Taken together, all of these are consistent with the existence of under-utilized judicial resources in the District Courts. The demand pressure coefficient shows that courts produce more output with no additional resources when the demand for court services increases; the use of trials to dispose of cases would not reduce productivity if there were under-utilized resources; sending judges to conduct business around the circuit would raise output in spite of travel time if there were insufficient court business to fully occupy them at home.

One should hasten to add, however, that the above interpretation is only logically consistent with the results obtained on the average over all ninety courts. That is, under-utilized resources need not exist in every court. Indeed, Chart 1 shows a wide variation among the courts in demand in equivalent judge

years relative to available judges, some courts being highly over-staffed with judges relative to demand, others being significantly under-staffed.

The efforts to explain statistically differences in true judicial productivity must assume that resources are fully utilized; further, until resources are fully employed, productivity is not relevant, as the additional costs of meeting increased demand are zero. To illustrate one possible bias to the results from under-utilized resources, consider the attempt to measure economies of scale. If small courts tend to have under-utilized resources while large courts do not, then a rise in observed average productivity associated with increased scale may be due not to organizational influences producing economies of scale, but rather simply to a decline in under-utilized judge time with no economies of scale.

Two further samples were constructed in an effort to include only courts where judges were likely to be fully utilized. One sample was of only "big" districts--those with four or more judges. The second sample included all "capacity" districts--those where in each year the available workload index per available judge was greater than two. This index is the sum of cases pending at the start of the year plus new case filings, all cases being appropriately weighted. It should be interpreted as an index rather than an absolute measure of available work because many of the pending cases are partly processed, thus absorbing less judge time to complete than the weight applied to them; similarly, many cases filed during a year will be carried to completion in subsequent years. As a rough approximation, assume that cases pending at

the start of a year are, on the average, fifty percent processed during the year. Thus, under these assumptions, an available workload index of 2.0 implies an absolute level of one equivalent judge year of work per available judge; courts with an index of 2.0 or greater would be at "capacity." These samples were used to estimate equations (2) and (4) with the results shown in Table 8. Using only big districts reduced the 1970-74 pooled sample size from 452 to 175, and using only capacity districts reduced it from 452 to 294.

The general results show few differences from the earlier cross-section and pooled sample results; the overall explanatory power is only slightly reduced and none of the significant coefficients changes sign. In particular, the demand pressure index remains easily the most statistically significant coefficient, although its t-ratio is reduced to approximately half the value in the unrestricted pooled samples. The size of the demand pressure coefficient, however, is only moderately reduced, signifying that even among the big districts and capacity districts a significant capacity to meet additional demand still exists. Further, the positive relation between productivity and both the use of trials and the number of places of holding court remains. There is one important difference in results from the unrestricted pooled samples; that is, there is no significant relationship between magistrates per available judge and productivity as was found in the unrestricted samples. A possible explanation for this is the fact that the variability in the magistrate resources among these courts is much smaller than among all courts.

TABLE 8

Average Judicial Productivity: Selected Districts Pooled
(t-ratios shown in parentheses)

Independent Variables:	EQ (2) Big Dist.[1] Pooled 70-74	EQ (2) Capacity Dist.[2] Pooled 70-74	EQ (4) Big Dist. Pooled 70-74	EQ (4) Capacity Dist. Pooled 70-74
Constant	.43645 (2.73)**	.48970 (3.82)**	.30621 (1.76)	.44632 (3.58)**
JUDAVAIL	.01518 (1.41)	.00886 (1.25)	.01222 (1.16)	-.00340 (-.47)
JUDAV**2	-.00044 (-1.13)	-.00026 (-.86)	-.00029 (-.75)	.00013 (0.42)
WEQJ/JAV	.30854 (13.41)**	.33230 (17.80)**	.30380 (13.62)**	.30697 (16.74)**
CV%TRWTD	.00072 (0.26)	.00773 (4.22)**	------	------
CR%TRWTD	.02550 (2.99)**	.00322 (0.61)	------	------
TRD/JAV	------	------	.00247 (3.33)**	.00165 (3.50)**
CVEQ/TEQ	-.49524 (-3.37)**	-.60385 (-5.09)**	-.55080 (-4.56)**	-.43025 (-4.29)**
%DEFWAC	-.00040 (.35)	.00110 (1.25)	.00121 (1.23)	.00100 (1.68)
PLHLDCT	.07174 (6.72)**	.04882 (6.48)**	.07661 (7.02)**	.05687 (7.39)**
MAG/JAV	.06438 (0.63)	.09669 (1.63)	.12802 (1.32)	.10032 (1.70)
Adjusted R^2	.63	.57	.64	.56
Districts	175	294	175	294

* significant at the 5% level

** significant at the 1% level

[1] A 'Big District' is defined as a District with four or more authorized judges.

[2] A 'Capacity District' is defined as any District in a given year which has an available workload per available judge, WEQJ/JAV, greater than 2.0.

The use of these samples of selected districts was an attempt to eliminate, to the extent possible, any bias induced by courts with significant idle resources and to see if this bias may have been the source of the unexpected results obtained using all districts. The evidence from these selected districts, however, further confirms the original results, the most important being the high elasticity of supply of court services. Courts--even those at "capacity"--retain the ability to process additional demand with existing resources.

As a final effort to explore further the reasons for the unexpected results from some of the variables, the model was estimated using changes in the values of the variables between years rather than using the yearly values themselves as in the annual cross-section estimates. The use of changes, under certain conditions, can produce better results if there are important omitted variables. Since we have conjectured that court productivity may also depend importantly upon variables which are not included in the model, this alternative approach offers potential advantages.

To illustrate these potential advantages, assume that an important omitted variable is the level of staffing in the U.S. Attorney's Office serving each District Court. Consider two courts, A and B; assume that in year (t) the U.S. District Attorney's Office is understaffed in A but not in B. Other things equal, it is reasonable to assume this difference in staffing would tend to make court A's productivity lower than that of court B. Consequently, omitting this variable from a cross-section estimate in year (t) will reduce the explanatory power of the estimating

equation because the lower productivity of A cannot be fully explained by only the included variables. Now assume that in a subsequent year, (t+n), these staffing patterns have not changed from year (t), but the values of the included explantory variables have changed. If we now use changes in these same variables to explain changes in court productivity between year (t) and (t+n), the omission of the staffing level will have no effect on our results because, by assumption, it has experienced no change. Under these assumptions, the estimation of changes in the variables can give better results than the estimation of the levels of the variables.

In this illustration of the possible effects of an omitted variable, note the importance of the assumption that the omitted variable did not change value over time in each court but did change values between courts at any point in time. If the values of omitted variables tend to differ less over time for any given court than they differ between courts at a point in time, then the use of changes will give more reliable results than the use of cross-sections. Frequently the relative importance of these two types of variability in omitted variables is an empirical question, therefore, the best choice of approach--differences or cross-section--also is, to a large degree, an empirical question. Since we lack the requisite empirical information to choose, we experimented with both.

Equation (2) was estimated using changes in the variables between two periods: 1968-1974 and 1970-1974. Relatively long periods were used to insure large changes in the observed variables. These results are reported in Table 9 for two different samples of

TABLE 9

Change in Average Judicial Productivity: Cross-Section Estimates
(t-ratios are shown below the coefficients)

Independent Variables:	Eq.(2) Δ(1974-68) All Dist.	Eq.(2) Δ(1974-70) All Dist.	Eq.(2) Δ(1974-68) Capacity Dist.	Eq.(2) Δ(1974-70) Capacity Dist.
Constant	.14857 (3.89)**	.07088 (2.13)*	.17552 (1.45)	.04119 (.56)
ΔJUDAVAIL	-.11885 (-3.60)**	-.05822 (-1.84)	-.10377 (-1.40)	-.07785 (-1.43)
ΔJUDAV**2	.00448 (4.17)**	.00215 (2.17)*	.00411 (1.91)	.00277 (1.84)
ΔWEQJ/JAV	.27079 (11.70)**	.30533 (11.70)**	.27037 (5.69)**	.27319 (6.15)**
ΔCV%TRWTD	.00253 (1.03)	.00034 (0.13)	.01243 (1.55)	-.00079 (-.13)
ΔCR%TRWTD	-.01466 (-1.67)	-.02206 (-2.36)*	-.04348 (-1.19)	-.02074 (-.79)
ΔTRD/JAV	- - - -	- - - -	- - - -	- - - -
ΔCVEQ/TEQ	-.47177 (-2.12)*	-.53537 (-2.61)*	-.67009 (-1.27)	-.81704 (-1.90)
Δ%DEFWAC	-.00186 (-1.43)	-.00203 (-1.49)	-.00354 (-1.12)	-.00215 (-.79)
ΔPLHLDCT	-.00762 (-.30)	.04102 (2.70)**	-.06956 (-.93)	.05285 (1.09)
ΔMAG/JAV	.21653 (2.61)*	.09703 (1.22)	.22446 (1.10)	.19525 (1.26)
Adjusted R^2	.79	.77	.73	.64
Districts	89	89	29	44

* significant at the 5% level

** significant at the 1% level

districts. The overall explanatory power of the equations remains quite similar to that obtained in the cross-section estimates, and most of this explanatory power is likewise derived primarily from the demand-pressure index. The change in court productivity is closely associated with the change in demand pressure per available judge in courts.

The signs and level of significance of individual coefficients, in many instances, exhibit important differences from the results obtained with the cross-section estimates. Especially noteworthy is the significantly negative coefficient for the use of criminal trials in one of the samples; negative signs were obtained in all of the other samples but in none of these samples was the coefficient significant. This negative sign conforms to the theoretical expectations and, of course, contrasts sharply with the cross-section results. The confimation of theory by the negative sign is diminished somewhat, however, by the small size of the coefficient. The size implies that a 10% increase in the percent of trials would reduce court productivity by only around 2%. The effect of increased trials, although now operating in the expected direction, is nevertheless very weak.

The negative relation of criminal trials is the only result obtained using differences that is consistently different from those reported using cross-sections. Given the long periods used to measure the changes and the possibility this opens for large changes to take place in important omitted variables, only the most robust relationships are likely to be revealed. These results, however, do give further support to the need to expand the model beyond the courts.

CHAPTER V. CONCLUSIONS

There is no need to review again the detailed results of the statistical analyses, but some general comments concerning these results are in order. The basic methodological assumption was the existence of uniformities in behavior among the District Courts sufficiently strong to be identifiable by statistical analyses in spite of the probable existence of important differences which were not identified. The results, although in some instances mixed, support this assumption and give promise of improved results from refining this approach.

Some of these results, however, consistently challenge widely accepted beliefs regarding courts. In particular, the evidence did not show trials as having a strong depressing effect on the productivity of courts,as is widely assumed; nor did the results support the corollary belief that courts, on the average, are operating at capacity. While both of these beliefs may indeed be true for selected courts, they do not appear to be empirically valid generalizations for most District Courts over the period of this study.

As guides to further research, it may be useful to suggest some explanations for these discrepancies between the conventional wisdom and the empirical results. First, while the observation that a case disposed at a pretrial stage must certainly use fewer court resources than a case disposed by trial may seem valid, one runs the risk of a fallacy of composition in generalizing this observation. The threat of a prompt trial, if credible, may

accelerate pretrial settlements. Second and most important, a court's performance as measured here depends significantly upon the characteristics of the private bar and the U.S. Attorneys practicing in the district. Without controlling for these factors, any results relating to court behavior must be considered as tentative.

The concept of a court's capacity is empirically an elusive concept because the quantity and intensity of case-related judicial inputs may vary significantly both between individual judges and between courts. Although a conscious effort was made to measure the actual quantity of judicial inputs, the measure was ultimately only in terms of judge months of service with the assumption that a month represented identical quantities of judicial inputs for all judges. If the number of actual hours of input per month varies with workload as the results suggest, then more accurate measures of judge time will be required both to measure true differences in court productivity and to define court capacity.

The failure of the study to introduce the demand for court services as a behavioral relationship rather than as a given quantity was revealed to be an important theoretical weakness in the research design. The statistical findings suggest that the demand for court services may be responsive to the length of court delay and to the extent to which trials are used in a court. Thus, the production activities of a court cannot be adequately estimated without simultaneously introducing a theory of demand for court services as well.

Finally, many of the variables introduced in the statistical models were highly collinear. While it may be impossible to eliminate completely all multicollinearity, by using transformations of the effected variables it may be possible to minimize the effects of the multicollinearity on the estimates.

It is along lines such as these that refinements in this approach should proceed. And until the results of such refinements and others have been determined, generalizations concerning the behavior of the Distric Courts are best considered as conjectures pending empirical validation or refutation.

NOTES

[1]Federal Judicial Center, The 1969-1970 Federal District Court Time Study, Washington, D.C., 1971.

[2]Arnould Enker, "Perspectives on plea bargaining," The President's Commission on Law Enforcement and the Administration of Justice, Task Force Report: The Courts, Washington, D.C., 1967, Appendix A.

[3]Warren E. Burger, "State of the Judiciary, 1970" Speech before the American Bar Association, St. Louis, Mo., Aug. 10, 1970, American Bar Association Journal, 56 (1970):929, 931.

[4]For an introduction to the profuse literature on court delay see Ronald H. Fremlin, Modern Judicial Administration: A Selected and Annotated Bibliography, Court Studies Division, National College of the State Judiciary, 1973. For an example of this debate see G. Joseph Tauro, "Court delay and the trial bar - one judge's opinion," Judicature, 52 (1969):414-418; Hans Zeisel, "Court delay and the bar: a rejoinder," Judicature, 53 (1969):111-113; Hans Zeisel, "Court delay caused by the bar?" American Bar Association Journal, 54 (1968): 886-888.

[5]Hans Zeisel, "Courts for Methuselah," University of Florida Law Review, 23 (1971):236.

[6]William M. Beaney, "The federal courts," Current History, 60 (1971):358; William A. McRae, "The administration of justice in the federal district court," University of Florida Law Review, 23 (1971):237-249; United States Senate, Committee on the Judiciary, Subcommittee on Improvements in Judicial Machinery, Crisis in the Federal Courts, Hearings, Washington, D.C., 1967.

[7]Burger, op. cit., note 3.

[8]United States Senate, Committee on the Judiciary, Subcommittee on Constitutional Rights, Speedy Trial, Hearings on Senate Bill 754, Washington, D.C., 1973; United States Senate, Committee on the Judiciary, Subcommittee on Constitutional Rights, Speedy Trial, Hearings on Senate Bill 895, Washington, D.C., 1971.

[9]Mark W. Cannon, "Can the Federal judiciary be an innovative system?" Public Administration Review, 33 (1973):74-79; Mark W. Cannon, "The Federal judicial system: highlights of administrative modernization," Criminology 12 (1974): 10-23.

[10]Rule 50(b), Federal Rules of Criminal Procedure.

[11]"A study of the plans submitted under this rule suggests that in part, courts have merely adopted their current performance standards to meet the rule," United States Senate (1971), op. cit., note 8, page 236.

[12]Ibid, page 3.

[13]National Advisory Commission on Criminal Justice Standards and Goals, Courts, Washington, D.C., 1973, page 46.

[14]Enker, op. cit., note 2.

[15]The empirical research that has been conducted studies court delay and is almost exclusively based upon case studies of individual courts. For examples of such research see L.G. Foschio, "Empirical research and the problem of court delay," in Fourth National Symposium on Law Enforcement: Reducing Court Delay, Institute of Law Enforcement and Criminal Justice, Washington, D.C., 1973; Lewis Katz, L. Litwin, and R. Bamberger, Justice Is the Crime: Pre-Trial Delay in Felony Cases, Case Western Reserve University Press, 1972; and Hans Zeisel, Harry Kalvin, and Bernard Bucholz, Delay In Court, Little Brown, 1959.

For examples of more general approaches see A. Blumstein and R. Larson, "Models of a total criminal justice system," Operations Research, 17 (1969).

[16]United States Senate (1973), op. cit., note 8, page 75.

[17]Cannon (1973), op. cit., note 5, page 75.

[18]Federal Judicial Center, op. cit., note 1.

[19]A more extended discussion of this particular measurement problem in criminal cases may be found in James Eisenstein and Herbert Jacob, "Measuring performance and output of urban courts," Social Science Quarterly, 54 (1974):713-24.

[20]A survey of judges upon whom the case weights are based was conducted during 1969 and 1970; our measure passed through 1.0 about this time. Federal Judicial Center, op. cit., note 1.

[21]Cannon (1974), op. cit., note 6, page 19.

[22]For a theoretical model which deals with all of these variables simultaneously, see Robert W. Gillespie, "Rationing by waiting: the case of court services," paper delivered at the Western Economic Association Convention, San Francisco, Calif., June 1976.

[23]For a theoretical and empirical analysis of the demand for trials, see William M. Landes, "An economic analysis of the courts," Journal of Law and Economics, 14 (April 14, 1971): 61-107.

[24]Administrative Office of the United States Courts, Manual of Instructions: Civil Docket Package and Cover Sheet, Washington, D.C., 1975, page 12.

APPENDIX A

In this appendix the methods used to construct the more complex variables used in the analysis are explained. These variables are of three types: the case weights, the case-related demand and output measures for each District Court, and the measures of judicial resources in each District. The Tables noted as data sources are found in the Annual Reports of The Administrative Office of the U.S. Courts.

Case Weight Derivation

The basic source of data for the case weights is the 1969-70 Federal District Court Time Study published by the Federal Judicial Center. These data, however, required two major adjustments to meet the needs of our analysis. First, the weights of the 227 original case types were aggregated into 42 types since case data by District Court is published only for the 42 groups. Second, these aggregated weights were corrected for a bias introduced by the methods employed in the Time Study.

To explain these adjustments the following notation is introduced.

W_k = Relative weight assigned to case type k in the Time Study. There are 168 civil types and 59 criminal types, 227 in total.

A_k = Absolute weight in judge time per case of type k.

N_k = Number of cases of type k in the Time Study sample.

PT_k = Percent of all judge time in sample accounted for by cases of type k.

PN_k = Percent of all cases in the sample accounted for by cases of type k.

TSC = Total judge time expended on all cases in the sample; 61,404 hours for civil cases and 22,170 hours for criminal cases.

NSC = Total number of cases in the sample; 22,600 civil cases and 9,181 criminal cases.

AA_j = Absolute weight j, judge time per case of aggregated group j. There are 25 civil groups and 18 criminal groups, 43 groups in total.

The Time Study defined the relative weights as:

$$(1) \quad W_k \equiv \frac{PT_i}{PN_i} ; \quad k = 1, 227$$

These relative weights are first converted into absolute weights by:

$$(2) \quad A_k = W_k \left(\frac{TSC}{NSC}\right) ; \quad k = 1, 227$$

These original 227 case weights are then aggregated into the 25 civil and 18 criminal classes used in Tables C3 and D3 by:

$$(3) \quad AA_j = \frac{\sum_{k=1}^{k_j} A_k N_k}{\sum_{k=1}^{k_j} N_k} ; \quad \text{where } k_j \text{ is the number of case types in group j and } j = 1, 43$$

Note that

$$(4) \quad PN_k \equiv \frac{N}{NSC} \cdot 100$$

and thus

$$(5) \quad N_k = \frac{PN_k \cdot NSC}{100}$$

Substituting (2) and (5) into (3) gives:

$$(6) \quad AA_j = \frac{TSC}{NSC} \cdot \frac{\sum_{k=1}^{j_k} PT_k}{\sum_{k=1}^{k_j} PN_k} ; \quad j = 1, 43$$

We have shown elsewhere[1] that the case weights derived from the Time Study should be increased by a correction factor

$$(7) \quad ACORR_j = \frac{T_j + S}{S}$$

Where T_j = the average time in the system -- from filing to disposition -- of cases of type j.

S = the length of the survey period, or 134 calendar days for the Time Study.

No direct estimate of the T_j's is available; however, for civil cases the following approximation was used based upon data appearing in Table C5a in the 1971 Annual Report of the Administrative Office. The approach described below is an estimate for two reasons. First, the best available data, Table C5a, were not published for the years covering the exact period of the Time Study. Second, the published measures are median times rather than means. These discrepancies notwithstanding, it was felt that some estimate of the correction was needed. This was constructed as follows:

Let $MALL_j$ = median time in the system of all cases of type j over all dispositions.

$MNCA_j$ = median time in the system of all cases of type j disposed with no court action.

$MCA1_j$ = median time in the system of all cases of type j disposed before pre-trial.

$MCA2_j$ = median time in the system of all cases of type j disposed after pre-trial.

$MCA3_j$ = median time in the system of all cases of type j disposed by trial.

[1] Robert W. Gillespie, "Measuring the Demand for Court Services: A Critique of the Federal District Courts Case Weights" Journal of the American Statistical Association vol. 69 (March, 1974), pp. 38-43.

$PNCA_j$ = proportion of cases of type j disposed of with no court action required.

$PCA1_j$ = proportion of all cases of type j disposed of before pretrial.

$PCA2_j$ = proportion of all cases of type j disposed of at pretrial.

$PCA3_j$ = proportion of all cases of type j disposed of by trial.

The above appear in Table C5a, and for each case type they are assumed to be related by the following formulae, i.e., that means are equal to the medians.

$$(8)\quad MALL_j = PNCA_j \cdot MNCA_j + PCA1_j \cdot MCA1_j + PCA2_j \cdot MCA2_j + PCA3_j \cdot MCA3_j$$

Since all of our weighted case measures exclude cases which do not require court action, we have

$$(9)\quad T_j \equiv \frac{1}{(1-PNCA_j)} \cdot \{PCA1_j \cdot MCA1_j + PCA2_j \cdot MCA2_j + PCA3_j \cdot MCA3_j\}$$

The $[1/(1-PNCA_j)]$ coefficient adjusts all of the disposition percentages to a base of total cases disposed by some form of court action rather than the base of all cases. Using (8) and (9) and converting the median times from months to days we have:

$$(10)\quad T_j \simeq \left\{\frac{MALL_j - PNCA_j \cdot MNCA_j}{(1 - PNCA_j)}\right\} \cdot 30$$

And substituting into (7), the computational formulae for each civil case type is:

$$(11)\quad ACORR_j = \frac{\left\{\frac{MALL_j - PNCA_j \cdot MNCA_j}{(1 - PNCA_j)}\right\} \cdot 30 + 134}{134}$$

For individual criminal case types, no published data are available on average time from filing to termination; consequently, to estimate the time in the system, the median time of all defendants was used. For fiscal year 1970, Table D6 gives the median time of criminal defendants in the system as 3.2 months or 96 days. Substituting into (7), the correction applied to all criminal cases is:

$$(12) \quad ACORR = \frac{96 + 134}{134} = 1.72$$

Combining (6) with (11) or (12) gives the complete computational formulae used to construct the case weights.

$$(13) \quad AA_j = (ACORR_j) \left(\frac{TSC}{NSC}\right) \cdot \frac{\sum_{k=1}^{k_j} PT_k}{\sum_{k=1}^{k_j} PN_k}$$

District Court Demand and Output Variables

The level of demand for District Court case-related services and the level of case-related output are each measured in two ways. The first is the traditional total annual case filings for demand and total annual case dispositions for output. The second is original with this study. It uses the case weights to first convert case filings into required judge years and then into equivalent judgeships as a measure of demand; a parallel procedure is applied to case dispositions to derive a measure of judge output in equivalent judge years.

The lack of case disposition data classified both by case type and by District Court requires an indirect approach to obtain these data. Such cross-classified case data are, however, available both

for case filings and cases pending at the end of each fiscal year. These data plus a simple accounting identity are exploited to obtain the case disposition data.

The objective of the case weighting is to derive an absolute measure of judge time required to process the cases; consequently, cases filed but disposed of without court action are eliminated from the case data before weighted demand or output variables are computed.

The following are introduced to set out the exact procedures used.

t = current fiscal year, $t = 1968, 1969, \ldots 1974$

$t-1$ = prior fiscal year

$CRCF_{ij}(t)$ = criminal cases filed in District j, offense category i during year t (Table D3); $i = 1, 18$

$CRCP_{ij}(t-1)$ = criminal pending in District j, nature of suit i during year t (Table D3a); $i = 1, 18$

$CVCF_{ij}(t)$ = civil cases filed in District j, nature of suit i during year t (Table C3)

$CVCP_{ij}(t-1)$ = civil cases pending in District j, nature of suit i during year t (Table C3a)

$CRCD_{ij}(t)$ = criminal cases disposed of in District j, offense category i during year t

$CVCD_{ij}(t)$ = civil cases disposed of in District j, offense category i during year t

$CROJHR_j(t)$ = Criminal output in District j during year t in judge hours

$CVOJHR_j(t)$ = Civil output in District j during year t in judge hours

$CROEQJ_j(t)$ = Criminal output in District j during year t in equivalent judge units

$CVOEQJ_j(t)$ = Civil output in District j during year t in equivalent judge units

$CRAA_i$ = Weight assigned to criminal offense type i, judge hours required to dispose of a typical case of type i

$CVAA_i$ = Weight assigned to civil suit i, judge hours required to dispose of a typical case of type i

$PNCA_i(t)$ = Percent of civil suits of type i disposed of without court action during year t. (Table C4)

$CRAWLHRS_j(t)$ = Hours of criminal available work during year t

$CVAWLHRS_j(t)$ = Hours of civil available work during year t

$CRAWLEQJ_j(t)$ = Criminal available work load during year t in equivalent judge units

$CVAWLEQJ_j(t)$ = Civil available work load during year t in equivalent judge units

EQJHR = 1302 case related judge hours per year

The number of hours of case-related time a judge is assumed to provide for each 12 months of service is derived as follows: from the 52 weeks are deducted 4 weeks of vacation, 2 weeks of holidays and 2 weeks of sick leave, thus giving 220 work days per year. At 8 hours per day this provides 1760 hours of judicial input. However, it is assumed -- following results from the Time Study -- that only 74% of judge activity is case related. This adjustment produces a value of EQJHR of 1302 hours of case-related activity per year per full-time judge.

$$(14) \quad CRCD_{ij}(t) = [CRCP_{ij}(t-1)] + [CRCF_{ij}(t)] - [CRCP_{ij}(t)]$$

$$(15) \quad CVCD_{ij}(t) = [CVCP_{ij}(t-1)] + [CVCF_{ij}(t)] - [CVCP_{ij}(t)]$$

$$(16) \quad CROJHR_j(t) = \sum_{i=1}^{18} (CRAA_i)\,[CRCD_i(t)]$$

$$(17) \quad CVOJHR_j(t) = \sum_{i=1}^{25} (CVAA_i)\,[1-PNCA_i(t)]\,[CVCD_{ij}(t)]$$

Thus, the output measures in equivalent judgeships are:

$$(18) \quad CROEQJ_j(t) = CRJHR_j(t)/EQJHR$$

$$(19) \quad CVOEQJ_j(t) = CVJHR_j(T)/EQJHR$$

$$(20)\quad OEQJ_j(t) = CROEQJ_j(t) + CVOEQJ_j(t)$$

$$(21)\quad CRAWLHRS_j(t) = \sum_{i=1}^{18} CRWT_i\{CRCF_i(t) + CRCP_i(t-1)\}$$

$$(22)\quad CVAWLHRS_j(t) = \sum_{i=1}^{25} (CVWT_i)\,[1-PNCA_i(t)] \times \{CVCF(t) + CVCP(t-1)\}$$

The available workload measures in equivalent judgeships are:

$$(23)\quad CRAWLEQJ_j(t) = CRAWLHRS_j(t)/EQJHR$$

$$(24)\quad CVAWLEQJ_j(t) = CVAWLHRS_j(t)/EQJHR$$

$$(25)\quad AWLEQJ_j(t) = CRAWLEQJ_j(t) + CVAWLEQJ_j(t)$$

The demand measures in equivalent judgeships are:

$$(26)\quad CRDEQJ_j(t) = \frac{1}{EQJHR}\left\{\sum_{i=1}^{18} (CRAA_i) \times [CRCF_{ij}(t)]\right\}$$

$$(27)\quad CVDEQJ_j(t) = \frac{1}{EQJHR}\left\{\sum_{i=1}^{25} (CVAA_i) \times [1-PNCA_i(t)] \times [CVCF_{ij}(t)]\right\}$$

$$(28)\quad DEQJ_j(t) = CRDEQJ_j(t) + CVDEQJ_j(t)$$

Measures of Judicial Resources

Several measures of the judicial resources associated with each District Court are used in the analysis. These are Judgeships Authorized, Judgeships Filled, and Judges Available; the sources and methods used to construct these measures are discussed in this section.

The fundamental resource concept is the number of judgeships, both permanent and temporary, authorized by law in each District Court. From the beginning of the period of the analysis through June 2, 1970, it was the Act of March 18, 1966, 80 Stat. 75; this was replaced by the Act of June 2, 1970, 84 Stat. 294. Although the authorized

number of judgeships increased in fiscal year 1970, we did not record the change in our data until the start of fiscal year 1971 -- one month later. Some official sources record the number of authorized judges in fiscal year 1970 as that of the new act although the act was effective only for one month of fiscal 1970 and none of the new judgeships was filled during fiscal 1970.

The number of Judgeships Filled adjusts the authorized judgeship figure for vacancies. Since 1971, the months of vacancies existing in each District Court are published annually in Court Management Statistics. For earlier years, the vacancies were derived from the Justice Department Registry. The vacancy months were converted to judge years and subtracted from the authorized judgeships.

The economic model used in the analysis requires that the judicial input be measured as accurately as possible. To accomplish this the judgeships filled are adjusted for roving judge services, visiting judge services and the services of senior judges; the result is the measure of Judgeship Available. During the period of our analysis eight multi-District Court states had one or more roving judges. Rather than allocate these roving judges on a pro rata basis, an effort was made to allocate their services to the Districts where they actually supplied them. Each roving judge was assumed to divide his annual service in proportion to the trial days he reported in each District. In most instances this produced a quite different allocation than a pro rata approach would have.

Many judges have temporary transfers to other District courts -- "visits" -- during a year. Data on these visits are published in Table VI in the Annual Reports of the Administrative Office and, in recent years,

in Court Management Statistics. These data are in calendar days; they were converted to judge years for our adjustments. Further adjustments were made only for net visits. It should also be noted that visits are defined from the point of view of the lending District Court. Thus a positive value of net visits by a court implies that the court was a net lender of judge services.

The services of senior judges were quite difficult to quantify in that this status permits them to be anything from completely inactive to work full time without any change in salary. The only systematic data relating to their level of activity is the number of trial days reported annually by each senior judge. To convert these data into judge years of service, the average number of trial days reported by all of the regular District Court judges was computed for each year. This average was then used to convert each senior judge's service in trial days into "judge years" of service to his District Court.

The construction of Judges Available data for each District Court may now be summarized as:

(29) Judge available = (Judgeships authorized) - (vacancy months / 12) - (net visit days / 365) + (Senior judge trial days / average trial days of all District Court judges).

APPENDIX B

Court Data and Correlation Matrices

APPENDIX B

TABLE B-1

Demand for Judicial Services by District Court: 1968-74
(Equivalent Judge Units per Available Judge)

	District Court	1968	1969	1970	1971	1972	1973	1974
1	District of Columbia	1.13	1.38	1.44	1.39	1.26	0.91	0.65
2	Maine	0.71	0.77	1.02	1.28	1.29	1.04	1.32
3	Massachusetts	0.95	1.16	1.35	2.25	3.25	2.16	2.43
4	New Hampshire	0.93	0.63	0.99	1.08	1.32	1.53	2.11
5	Rhode Island	0.46	0.46	0.51	0.74	0.77	0.76	0.93
6	Puerto Rico	1.24	2.06	2.08	1.43	1.59	1.93	1.91
7	Connecticut	0.71	0.72	0.93	0.84	0.99	1.08	1.39
8	New York-Northern	0.70	0.80	0.92	1.08	1.36	1.16	1.15
9	New York-Eastern	0.74	0.59	0.81	1.02	0.96	1.05	1.34
10	New York-Southern	0.97	1.09	1.01	1.21	1.10	0.99	1.01
11	New York-Western	0.63	0.79	0.78	0.90	1.01	1.33	1.29
12	Vermont	0.77	0.76	0.97	0.90	1.46	0.91	1.04
13	Delaware	0.41	0.46	0.32	0.42	0.43	0.47	0.56
14	New Jersey	0.99	1.06	1.20	0.97	1.04	1.10	1.18
15	Pennsylvania-Eastern	1.01	1.04	1.13	1.17	0.78	0.84	0.90
16	Pennsylvania-Middle	1.04	0.90	1.35	0.87	0.84	0.86	1.11
17	Pennsylvania-Western	0.94	0.87	0.95	0.66	0.52	0.54	0.62
18	Maryland	1.09	1.61	1.38	1.21	0.90	0.97	1.07
19	North Carolina-East.	1.33	1.00	1.31	0.98	0.88	1.09	1.13
20	North Carolina-Middle	0.79	0.86	0.94	1.07	1.34	1.55	1.66
21	North Carolina-West.	0.99	1.06	1.11	1.09	1.11	1.38	1.42
22	South Carolina	1.28	1.24	1.29	1.40	1.35	1.50	1.71
23	Virginia-Eastern	1.52	1.67	2.05	2.16	1.71	1.72	2.04
24	Virginia-Western	0.96	1.03	2.27	1.41	1.58	1.58	2.32
25	West Virginia-North.	1.00	1.21	1.46	1.28	1.04	1.06	1.59
26	West Virginia-South.	1.24	1.22	1.53	1.22	1.06	1.25	1.33
27	Alabama-Northern	1.35	1.39	1.48	1.43	1.24	1.20	1.32
28	Alabama-Middle	1.13	1.27	1.72	1.70	1.30	1.58	1.40
29	Alabama-Southern	1.13	1.04	0.78	1.19	0.82	0.93	0.91
30	Florida-Northern	0.79	0.77	1.23	1.08	1.01	1.16	1.20
31	Florida-Middle	1.01	1.12	1.29	1.19	1.19	1.43	1.33
32	Florida-Southern	0.98	1.20	1.55	1.18	1.16	1.28	1.53
33	Georgia-Northern	1.68	1.63	2.06	1.56	1.33	1.61	2.11
34	Georgia-Middle	1.05	0.83	1.14	1.20	1.09	1.02	1.30
35	Georgia-Southern	1.98	1.71	3.01	1.96	1.55	1.49	1.86
36	Louisiana-Eastern	1.36	1.53	1.78	1.92	1.37	1.63	1.68
37	Louisiana-Western	1.38	1.43	1.81	1.30	1.43	1.24	1.50
38	Mississippi-Northern	2.59	0.82	0.88	1.00	0.85	1.18	1.30
39	Mississippi-Southern	0.88	0.75	0.86	1.02	0.99	1.20	1.21
40	Texas-Northern	1.81	1.27	1.53	1.55	1.54	1.75	2.05

	District Court	1968	1969	1970	1971	1972	1973	1974
41	Texas-Eastern	2.76	1.54	1.62	1.66	1.36	1.37	1.64
42	Texas-Southern	1.10	1.47	1.87	1.78	1.80	1.70	1.59
43	Texas-Western	1.27	1.49	1.93	1.87	2.20	1.62	1.62
44	Kentucky-Eastern	1.25	1.47	1.77	1.80	1.25	1.90	1.72
45	Kentucky-Western	1.46	1.55	1.49	1.49	1.22	1.28	1.21
46	Michigan-Eastern	0.96	0.93	1.37	1.16	1.15	1.30	1.47
47	Michigan-Western	0.90	0.86	1.01	1.42	1.98	1.84	1.73
48	Ohio-Northern	1.12	1.07	1.18	1.28	1.19	1.44	1.44
49	Ohio-Southern	1.13	1.07	1.25	1.28	1.01	1.21	1.62
50	Tennessee-Eastern	1.49	1.68	1.57	1.63	1.39	1.49	1.61
51	Tennessee-Middle	2.01	2.12	2.37	1.67	1.31	1.55	1.86
52	Tennessee-Western	1.09	0.81	1.58	1.25	1.05	1.16	1.35
53	Illinois-Northern	1.00	1.15	1.21	1.52	1.12	1.21	1.18
54	Illinois-Eastern	0.71	0.81	0.90	0.98	1.00	1.13	1.19
55	Illinois-Southern	0.76	0.74	0.90	1.02	0.93	1.08	1.26
56	Indiana-Northern	1.02	0.95	1.13	1.32	1.19	0.84	1.54
57	Indiana-Southern	0.93	1.08	1.25	1.30	1.25	1.27	1.41
58	Wisconsin-Eastern	0.68	0.86	1.00	1.00	1.61	1.78	1.62
59	Wisconsin-Western	0.93	1.07	1.73	1.83	1.60	1.65	1.75
60	Arkansas-Eastern	0.59	0.82	1.63	1.66	1.19	1.38	1.75
61	Arkansas-Western	0.86	0.92	0.82	0.81	0.91	1.08	1.28
62	Iowa-Northern	0.54	0.58	0.84	0.75	0.77	0.75	1.05
63	Iowa-Southern	0.85	0.88	0.89	1.08	1.31	1.17	1.28
64	Minnesota	0.85	0.89	1.18	1.40	1.56	1.39	1.29
65	Missouri-Eastern	1.11	0.96	1.20	1.34	1.21	1.33	1.35
66	Missouri-Western	0.75	0.78	1.15	1.18	1.28	1.21	1.62
67	Nebraska	0.78	0.67	0.81	0.93	0.85	0.91	0.90
68	North Dakota	0.37	0.43	0.33	0.38	0.40	0.36	0.60
69	South Dakota	0.51	0.60	0.86	0.64	0.60	1.00	1.09
70	Alaska	0.67	0.60	0.66	0.66	0.91	0.88	1.32
71	Arizona	0.89	1.13	1.47	1.65	1.52	1.40	1.27
72	California-Northern	1.05	1.09	1.26	1.26	1.12	1.03	1.06
73	California-Eastern	1.02	1.21	1.51	1.38	1.28	1.56	1.55
74	California-Central	0.95	1.03	1.22	1.32	1.18	1.27	1.31
75	California-Southern	2.16	2.45	2.59	1.74	1.28	1.25	1.67
76	Hawaii	0.39	0.43	0.66	0.57	0.71	0.80	0.97
77	Idaho	0.52	0.65	0.61	0.56	0.59	0.65	0.71
78	Montana	0.69	0.65	0.67	0.80	0.94	0.87	0.98
79	Nevada	0.87	0.87	0.85	1.07	0.92	1.02	1.19
80	Oregon	1.46	1.37	1.59	1.69	2.29	1.63	1.63
81	Washington-Eastern	0.57	0.76	1.18	1.04	1.01	0.96	1.25
82	Washington-Western	0.98	1.28	1.14	1.17	1.15	1.29	1.51
83	Colorado	1.15	1.14	1.38	1.27	1.21	1.23	1.46
84	Kansas	0.94	1.26	1.03	1.34	1.15	1.40	1.23
85	New Mexico	1.22	1.26	1.40	0.89	1.02	1.23	1.27
86	Oklahoma-Northern	0.98	0.88	1.44	1.53	1.25	1.18	1.47
87	Oklahoma-Eastern	1.16	0.97	0.96	1.00	0.97	1.07	1.43
88	Oklahoma-Western	0.81	0.80	0.91	0.99	1.20	1.19	1.39
89	Utah	0.64	0.93	0.89	0.85	0.91	0.94	1.18
90	Wyoming	0.60	0.62	0.87	1.18	0.94	0.95	1.10
91	Louisiana-Middle	-	-	-	-	-	1.56	1.63

Source: Computed by Equation (28), Appendix A

TABLE B-2

Output of Judicial Services by District Court: 1968-74
(Equivalent Judge Units per Available Judge)

	District Court	1968	1969	1970	1971	1972	1973	1974
1	Dist. of Columbia	1.17	1.26	1.39	1.38	1.45	1.56	0.94
2	Maine	0.74	0.68	0.80	1.02	1.15	1.17	1.31
3	Massachusetts	1.01	1.00	1.02	1.47	1.84	1.13	1.63
4	New Hampshire	0.90	0.63	0.88	0.74	1.28	1.56	1.73
5	Rhode Island	0.63	0.57	0.57	0.58	0.65	0.85	0.86
6	Puerto Rico	1.16	1.47	1.41	1.11	1.43	1.65	1.77
7	Connecticut	0.61	0.59	0.74	0.80	0.93	1.01	1.09
8	New York-Northern	0.66	0.73	0.93	0.82	1.21	1.25	1.34
9	New York-Eastern	0.73	0.65	0.83	0.82	0.82	0.96	1.35
10	New York-Southern	0.91	0.99	0.96	1.10	1.09	1.42	1.26
11	New York-Western	0.63	0.65	0.67	0.79	0.94	1.11	1.20
12	Vermont	0.78	0.64	0.98	0.86	1.29	1.00	0.97
13	Delaware	0.36	0.45	0.29	0.33	0.42	0.53	0.52
14	New Jersey	0.91	0.91	0.97	0.89	0.96	1.02	1.15
15	Pennsylvania-Eastern	0.92	1.03	1.37	1.14	0.97	1.04	0.98
16	Pennsylvania-Middle	0.91	0.89	1.19	0.93	0.78	1.00	0.99
17	Pennsylvania-Western	0.77	0.81	0.91	0.87	0.74	0.60	0.60
18	Maryland	1.01	1.38	1.24	1.16	1.04	1.09	1.06
19	North Carolina-East.	1.35	1.20	1.06	0.95	0.94	0.99	1.59
20	North Carolina-Mid.	0.82	0.74	0.80	1.10	1.26	1.41	1.22
21	North Carolina-West.	0.94	0.96	1.01	1.17	1.26	1.39	1.51
22	South Carolina	1.18	1.13	1.21	1.36	1.28	1.61	1.91
23	Virginia-Eastern	1.53	1.60	1.73	1.98	2.01	1.90	1.99
24	Virginia-Western	1.03	0.91	1.85	1.44	1.46	1.63	1.84
25	W.Virginia-Northern	0.78	0.89	1.40	1.37	1.02	0.98	1.08
26	W.Virginia-Southern	1.24	0.94	1.28	1.05	0.94	1.09	1.36
27	Alabama-Northern	1.32	1.25	1.30	1.24	1.21	1.17	1.52
28	Alabama-Middle	1.10	1.22	1.48	1.61	1.25	1.56	0.99
29	Alabama-Southern	1.20	0.80	0.77	1.20	1.12	1.19	1.17
30	Florida-Northern	0.91	0.95	1.03	1.16	1.03	1.08	1.25
31	Florida-Middle	1.07	1.08	1.13	1.18	1.10	1.39	1.50
32	Florida-Southern	0.99	1.16	1.38	1.12	1.34	1.27	1.67
33	Georgia-Northern	1.58	1.56	1.85	1.43	1.31	1.54	1.23
34	Georgia-Middle	0.99	0.85	0.96	1.15	1.02	1.04	1.11
35	Georgia-Southern	1.79	1.84	2.57	2.20	1.75	1.42	1.58
36	Louisiana-Eastern	1.45	1.59	1.70	1.63	1.69	1.86	1.68
37	Louisiana-Western	1.33	1.18	1.55	1.26	0.94	1.50	1.31
38	Mississippi-Northern	2.11	1.03E	0.92V	0.80C	0.98	1.01	1.13
39	Mississippi-Southern	0.92	0.91	0.79	0.92	0.92	1.26	1.08
40	Texas-Northern	1.54	1.29	1.35	1.46	1.41	1.60	1.85
41	Texas-Eastern	2.46	1.58	1.43	1.33	1.39	1.50	1.53
42	Texas-Southern	1.04	1.31	1.62	1.65	1.68	1.54	1.62

	District Court	1968	1969	1970	1971	1972	1973	1974
43	Texas-Western	1.22	1.40	1.79	1.87	2.09	1.48	1.56
44	Kentucky-Eastern	1.14	1.29	1.60	1.60	0.95	1.83	1.89
45	Kentucky-Western	1.19	1.32	1.26	1.71	1.17	1.31	1.14
46	Michigan-Eastern	0.91	0.87	1.23	1.00	1.27	1.29	1.23
47	Michigan-Western	0.83	0.83	0.88	1.02	1.38	1.40	1.67
48	Ohio-Northern	1.10	1.08	1.02	1.01	1.31	1.48	1.47
49	Ohio-Southern	0.95	0.97	1.07	1.13	1.25	1.33	1.48
50	Tennessee-Eastern	1.32	1.47	1.59	1.68	1.47	1.53	1.62
51	Tennessee-Middle	2.11	1.88	2.02	1.81	1.45	1.45	1.80
52	Tennessee-Western	1.24	0.66	1.33	1.22	1.04	1.07	1.18
53	Illinois-Northern	1.11	1.09	1.12	1.34	1.09	1.16	1.13
54	Illinois-Eastern	0.70	0.80	0.79	0.86	0.90	1.03	1.06
55	Illinois-Southern	0.77	0.79	0.76	0.84	1.03	1.09	1.08
56	Indiana-Northern	1.05	0.92	0.98	1.01	1.21	0.76	1.40
57	Indiana-Southern	0.82	0.87	0.99	1.19	1.24	1.41	1.39
58	Wisconsin-Eastern	0.72	0.71	0.81	0.95	1.42	1.63	1.46
59	Wisconsin-Western	1.01	1.02	0.96	1.34	1.39	1.62	1.54
60	Arkansas-Eastern	0.60	0.74	1.31	1.74	1.11	1.26	1.36
61	Arkansas-Western	0.79	0.77	0.79	0.79	0.97	0.78	1.18
62	Iowa-Northern	0.49	0.52	0.69	0.78	0.71	0.57	1.03
63	Iowa-Southern	0.70	0.93	0.76	1.01	1.05	1.13	1.20
64	Minnesota	0.76	0.87	1.18	1.12	1.38	1.33	1.24
65	Missouri-Eastern	0.93	1.04	1.08	1.17	1.21	1.25	1.27
66	Missouri-Western	0.58	0.81	1.07	1.24	1.11	1.10	1.48
67	Nebraska	0.72	0.63	0.70	0.96	0.91	0.87	0.89
68	North Dakota	0.36	0.44	0.37	0.41	0.32	0.32	0.52
69	South Dakota	0.60	0.55	0.73	0.69	0.58	0.69	0.91
70	Alaska	0.60	0.49	0.57	0.65	0.82	1.01	1.24
71	Arizona	0.90	1.14	1.26	1.38	1.41	1.30	1.16
72	California-Northern	0.90	0.85	1.07	1.14	1.28	1.12	1.08
73	California-Eastern	1.13	1.18	1.40	1.30	1.23	1.40	1.51
74	California-Central	0.91	0.96	1.13	1.14	1.13	1.17	1.23
75	California-Southern	1.68	2.26	2.41	1.59	1.39	1.13	1.38
76	Hawaii	0.48	0.46	0.49	0.60	0.62	0.67	0.83
77	Idaho	0.54	0.51	0.63	0.51	0.54	0.63	0.62
78	Montana	0.62	0.64	0.70	0.68	0.97	0.76	0.89
79	Nevada	0.72	0.78	0.84	1.00	0.83	0.90	1.06
80	Oregon	1.42	1.16	1.48	1.55	2.00	1.51	1.61
81	Washington-Eastern	0.58	0.70	1.12	0.89	1.12	0.80	1.08
82	Washington-Western	0.77	1.10	1.01	1.08	1.04	1.22	1.45
83	Colorado	0.97	1.05	1.18	1.07	1.27	1.18	1.11
84	Kansas	0.87	1.26	1.00	1.08	1.23	1.17	1.31
85	New Mexico	1.22	1.24	1.24	0.93	0.94	1.09	1.21
86	Oklahoma-Northern	0.93	0.85	1.13	1.12	1.28	1.07	1.35
87	Oklahoma-Eastern	0.97	1.20	0.92	1.11	1.07	0.89	1.42
88	Oklahoma-Western	0.77	0.78	0.91	0.97	1.09	1.18	1.24
89	Utah	0.52	0.77	0.90	0.74	0.81	0.89	1.13
90	Wyoming	0.58	0.61	0.87	0.86	1.08	0.89	1.10
91	Louisiana-Middle	-	-	-	-	-	2.01	1.62

Source: Computed by Equation (20), Appendix A

TABLE B-3

Median Processing Times of Criminal Defendants in District Courts: 1974-68
(Months)

		1968	1969	1970	1971	1972	1973	1974
1	Washington, D. C.	9.5	6.4	8.4	7.6	8.2	7.7	5.7
2	Maine	2.7	2.1	2.4	3.2	4.3	5.3	4.2
3	Massachusetts	4.7	4.0	4.0	3.7	4.6	7.6	8.4
4	New Hampshire	3.3	3.8	4.3	8.6	5.0	5.9	5.1
5	Rhode Island	9.8	10.7	10.6	8.2	7.6	6.3	3.5
6	Puerto Rico	3.3	3.4	10.9	7.2	5.[illegible]	5.9	6.7
7	Connecticut	4.4	5.2	5.6	6.7	6.7	6.8	7.9
8	New York - Northern	3.6	4.3	3.8	4.8	5.0	7.6	7.1
9	New York - Eastern	9.4	9.2	5.0	4.7	5.4	6.8	6.4
10	New York - Southern	5.2	6.1	10.6	9.2	6.3	6.8	5.7
11	New York - Western	4.8	5.0	7.4	4.3	7.1	5.9	12.1
12	Vermont	2.9	7.5	3.3	4.5	2.1	2.9	4.8
13	Delaware	5.6	6.3	7.5	7.6	7.8	4.9	16.8
14	New Jersey	9.8	6.9	7.9	12.6	10.7	11.7	12.7
15	Pennsylvania - Eastern	7.9	8.1	12.2	8.5	7.4	7.0	4.3
16	Pennsylvania - Middle	4.2	4.9	6.7	6.6	5.9	5.3	5.1
17	Pennsylvania - Western	4.2	4.3	5.6	7.0	6.1	7.0	5.8
18	Maryland	6.4	6.4	7.0	6.4	5.6	5.7	5.6
19	North Carolina - Eastern	2.3	2.1	2.3	2.3	2.1	2.6	3.2
20	North Carolina - Middle	3.0	1.7	2.1	1.7	2.2	2.9	2.3
21	North Carolina - Western	1.3	1.2	1.3	1.4	1.7	2.2	3.1
22	South Carolina	1.8	2.0	2.0	2.7	2.6	2.5	2.3
23	Virginia - Eastern	2.6	2.9	3.2	2.9	3.1	2.8	2.4
24	Virginia - Western	0.7	0.4	0.7	0.1	0.8	0.8	0.7
25	West Virginia - Northern	4.3	4.5	2.0	3.1	3.3	3.7	2.8
26	West Virginia - Southern	2.0	2.2	2.5	2.4	3.7	2.8	4.0
27	Alabama - Northern	2.4	2.3	2.7	2.1	3.0	3.1	1.7
28	Alabama - Middle	2.3	1.7	2.5	2.5	2.7	2.3	2.2
29	Alabama - Southern	3.0	3.2	12.7	10.9	3.5	2.8	4.1
30	Florida - Northern	2.4	2.1	3.1	2.1	2.9	2.7	2.8
31	Florida - Middle	3.9	3.3	4.5	5.3	3.9	5.8	4.5

TABLE B-3

		1968	1969	1970	1971	1972	1973	1974
32	Florida - Southern	6.7	4.1	4.1	4.2	3.4	3.0	3.2
33	Georgia - Northern	4.0	3.5	4.5	4.1	4.7	4.0	4.1
34	Georgia - Middle	3.4	1.6	2.7	2.0	3.2	2.6	2.1
35	Georgia - Southern	4.0	4.5	4.2	3.1	2.7	2.7	3.3
36	Louisiana - Eastern	4.5	4.2	4.3	3.9	8.1	2.9	2.7
37	Louisiana - Western	1.0	1.2	1.5	4.5	8.1	4.8	4.1
38	Mississippi - Northern	2.6	5.0	3.9	3.3	3.7	3.7	3.0
39	Mississippi - Southern	5.9	6.2	4.2	3.4	4.8	4.9	4.1
40	Texas - Northern	3.3	3.4	3.6	2.6	2.5	2.9	3.0
41	Texas - Eastern	1.7	1.5	5.2	3.1	3.4	5.0	3.2
42	Texas - Southern	1.6	0.9	0.9	0.1	0.8	2.9	3.4
43	Texas - Western	1.2	0.7	1.2	0.9	0.7	2.5	3.0
44	Kentucky - Eastern	0.9	0.4	1.0	0.9	2.1	3.1	4.2
45	Kentucky - Western	1.1	0.4	0.9	0.9	1.3	1.6	1.3
46	Michigan - Eastern	6.5	5.5	7.6	8.1	5.7	5.8	6.3
47	Michigan - Western	2.8	2.2	2.9	2.3	2.8	4.1	4.1
48	Ohio - Northern	4.7	3.3	4.8	6.1	4.5	4.6	3.4
49	Ohio - Southern	2.9	1.9	3.6	2.8	3.2	3.8	4.0
50	Tennessee - Eastern	1.9	2.3	2.8	2.3	2.8	2.0	2.3
51	Tennessee - Middle	4.5	3.3	3.3	3.2	4.2	2.9	2.5
52	Tennessee - Western	3.6	3.7	4.1	5.3	6.2	6.7	5.5
53	Illinois - Northern	5.0	4.5	6.4	3.9	5.0	5.5	5.2
54	Illinois - Eastern	2.5	1.9	3.6	3.5	5.3	5.1	5.6
55	Illinois - Southern	4.2	2.6	4.3	5.8	5.9	4.1	3.7
56	Indiana - Northern	3.3	3.6	4.9	5.4	6.0	5.9	5.7
57	Indiana - Southern	5.8	4.6	5.1	5.5	4.7	4.8	4.8
58	Wisconsin - Eastern	4.8	6.3	6.0	4.3	6.6	6.5	6.3
59	Wisconsin - Western	5.7	3.8	6.3	6.9	7.6	8.0	5.6
60	Arkansas - Eastern	2.0	0.9	1.9	1.5	2.7	2.9	2.9
61	Arkansas - Western	2.3	1.6	3.0	1.8	4.1	3.1	4.5
62	Iowa - Northern	2.8	2.0	3.4	3.1	2.5	2.9	2.5
63	Iowa - Southern	2.5	2.2	3.3	3.1	4.1	3.8	3.8
64	Minnesota	3.3	3.5	2.8	3.4	4.5	4.8	3.7
65	Missouri - Eastern	2.5	2.1	2.5	2.2	2.8	3.0	2.9

		1968	1969	1970	1971	1972	1973	1974
66	Missouri - Western	2.8	2.6	4.3	4.4	3.7	4.7	3.3
67	Nebraska	4.4	3.2	4.3	5.1	3.8	2.9	4.0
68	North Dakota	2.4	2.2	4.8	3.9	4.4	4.0	2.6
69	South Dakota	3.7	2.9	2.4	3.4	4.3	5.8	4.2
70	Alaska	1.8	2.5	2.1	4.9	3.3	2.8	2.0
71	Arizona	2.0	1.6	2.0	2.4	2.9	3.4	3.2
72	California - Northern	2.8	3.0	5.9	5.4	5.3	4.9	4.4
73	California - Eastern	2.4	1.4	2.2	1.1	1.7	1.8	2.5
74	California - Central	2.8	2.4	3.0	2.7	3.3	3.3	3.5
75	California - Southern	2.2	1.2	2.0	2.6	2.9	2.6	2.8
76	Hawaii	3.1	3.5	4.0	3.7	4.2	5.3	8.1
77	Idaho	2.3	1.9	2.4	1.4	3.2	3.5	3.7
78	Montana	1.0	0.6	2.1	1.2	1.7	2.0	2.8
79	Nevada	3.0	2.9	3.9	4.2	3.9	4.8	4.4
80	Oregon	2.5	2.2	4.5	3.7	4.3	3.9	3.8
81	Washington - Eastern	1.9	1.6	2.5	2.3	3.1	4.2	4.1
82	Washington - Western	2.9	3.2	3.6	3.0	3.7	3.6	3.5
83	Colorado	3.1	3.2	4.7	4.3	3.9	3.4	3.4
84	Kansas	3.1	3.3	4.1	4.1	4.6	4.4	4.2
85	New Mexico	1.7	1.4	1.7	1.6	2.4	3.0	2.9
86	Oklahoma - Northern	1.4	1.3	2.2	1.2	1.2	2.2	1.9
87	Oklahoma - Eastern	2.3	2.0	3.7	2.0	2.5	2.8	2.6
88	Oklahoma - Western	2.0	1.5	1.9	1.7	2.2	2.5	2.3
89	Utah	1.3	1.5	3.4	1.9	4.2	4.5	3.7
90	Wyoming	1.4	1.0	1.7	0.9	1.5	1.3	1.0

Source: Administrative Office of the U.S. Courts
Annual Reports, Table D-6

TABLE B-4

Median Processing Times of Civil Cases Disposed of by Court Action in District Courts: 1968-74
(Months)

		1968	1969	1970	1971	1972	1973	1974
1	Washington, D. C.	5.8	6.3	10.6	9.6	10.6	10.8	8.4
2	Maine	9.2	7.6	7.9	7.0	10.0	11.6	14.0
3	Massachusetts	18.6	11.0	11.0	13.6	11.0	12.0	18.0
4	New Hampshire	21.9	22.2	14.2	11.9	12.5	10.7	8.9
5	Rhode Island	28.7	18.0	12.9	13.0	11.2	12.1	10.2
6	Puerto Rico	8.9	7.0	7.8	11.7	20.2	17.4	21.0
7	Connecticut	20.7	16.5	10.6	13.0	16.1	19.4	14.6
8	New York - Northern	15.0	17.5	17.2	11.0	23.2	23.1	17.0
9	New York - Eastern	24.6	38.3	12.0	12.6	14.0	13.8	12.4
10	New York - Southern	30.8	39.5	31.2	20.5	22.5	27.5	20.5
11	New York - Western	18.4	22.6	19.3	16.6	19.6	18.4	16.3
12	Vermont	10.0	10.0	12.1	9.0	11.0	16.2	11.2
13	Delaware	27.2	20.5	15.4	18.3	13.6	11.9	16.6
14	New Jersey	16.5	14.7	17.3	14.7	12.5	11.5	14.5
15	Pennsylvania - Eastern	48.0	51.3	39.1	23.4	21.9	18.4	18.3
16	Pennsylvania - Middle	17.3	18.4	22.0	16.0	15.9	12.6	14.7
17	Pennsylvania - Western	18.5	16.2	17.0	32.7	21.5	14.5	11.6
18	Maryland	15.2	16.3	13.8	13.0	17.0	12.8	12.2
19	North Carolina - Eastern	17.6	12.5	8.7	11.2	13.1	11.6	13.0
20	North Carolina - Middle	9.8	12.6	7.5	11.3	11.2	10.8	13.3
21	North Carolina - Western	18.0	15.9	5.8	13.8	13.3	9.1	10.3
22	South Carolina	11.5	10.3	10.3	11.3	10.0	9.1	7.3
23	Virginia - Eastern	11.9	9.7	8.8	9.6	9.5	7.6	8.3
24	Virginia - Western	7.0	8.4	5.0	7.7	7.6	9.9	8.7
25	West Virginia - Northern	10.9	17.8	21.4	19.8	25.8	10.7	25.3
26	West Virginia - Southern	11.8	13.1	11.1	11.5	16.1	10.4	14.2
27	Alabama - Northern	7.7	7.4	8.6	8.4	8.3	8.3	8.7
28	Alabama - Middle	5.7	4.5	5.7	6.8	5.0	5.5	5.5
29	Alabama - Southern	17.0	16.3	14.9	13.9	14.8	10.6	7.3
30	Florida - Northern	18.4	12.2	7.0	7.3	5.8	5.6	6.2

		1968	1969	1970	1971	1972	1973	1974
31	Florida - Middle	9.8	9.1	8.8	5.0	6.7	6.9	10.3
32	Florida - Southern	10.8	8.4	8.3	8.3	5.5	4.7	4.5
33	Georgia - Northern	11.9	13.7	11.7	12.5	11.0	10.1	7.8
34	Georgia - Middle	7.8	8.4	5.0	8.8	8.0	10.1	8.1
35	Georgia - Southern	13.6	15.8	13.5	11.0	13.8	9.7	8.0
36	Louisiana - Eastern	21.6	15.4	12.5	11.0	13.7	15.1	14.8
37	Louisiana - Western	17.2	18.0	14.5	18.4	16.5	18.3	14.7
38	Mississippi - Northern	11.1	13.7	13.7	8.7	10.0	12.8	10.6
39	Mississippi - Southern	8.7	11.1	7.5	9.3	8.0	8.1	10.8
40	Texas - Northern	7.6	9.3	8.8	8.4	8.4	8.8	11.8
41	Texas - Eastern	11.2	12.5	12.3	9.4	12.2	10.6	11.7
42	Texas - Southern	15.5	14.2	12.4	12.0	13.9	11.8	14.4
43	Texas - Western	7.9	2.0	2.3	2.0	4.1	5.0	8.4
44	Kentucky - Eastern	15.6	8.9	10.4	14.7	13.0	14.4	15.4
45	Kentucky - Western	8.7	10.3	7.0	10.1	12.5	12.8	13.1
46	Michigan - Eastern	19.0	14.6	3.4	14.0	13.1	12.0	11.8
47	Michigan - Western	13.9	16.2	16.6	11.6	10.3	12.5	20.1
48	Ohio - Northern	18.5	20.9	15.1	10.2	14.0	12.3	13.1
49	Ohio - Southern	15.5	17.6	10.7	9.9	13.0	11.4	11.4
50	Tennessee - Eastern	8.1	6.7	6.8	7.8	6.4	7.9	6.3
51	Tennessee - Middle	15.1	20.6	9.8	14.5	7.9	8.8	6.0
52	Tennessee - Western	10.9	10.4	11.6	10.9	11.9	13.7	10.2
53	Illinois - Northern	10.8	7.5	8.9	5.6	7.8	8.1	7.0
54	Illinois - Eastern	15.0	11.9	12.5	12.3	12.0	9.8	16.2
55	Illinois - Southern	17.6	12.7	11.6	10.2	8.9	9.8	7.4
56	Indiana - Northern	18.4	13.3	17.3	16.3	15.3	14.8	17.0
57	Indiana - Southern	9.1	8.1	9.1	9.8	11.3	15.2	10.3
58	Wisconsin - Eastern	18.7	13.9	11.0	8.9	16.5	17.6	17.5
59	Wisconsin - Western	15.3	15.0	6.0	7.3	18.3	17.0	24.2
60	Arkansas - Eastern	7.9	8.9	8.3	12.4	12.7	12.8	15.0
61	Arkansas - Western	7.0	7.3	7.6	10.3	9.6	9.7	11.9
62	Iowa - Northern	12.2	10.7	9.3	9.8	8.2	8.3	11.1
63	Iowa - Southern	15.6	11.3	15.8	13.4	14.9	21.2	19.3
64	Minnesota	10.3	10.0	9.4	8.2	7.7	8.6	10.5
65	Missouri - Eastern	7.4	9.9	7.4	5.0	5.0	5.0	7.2
66	Missouri - Western	8.3	10.6	9.5	8.3	6.3	8.1	8.9

		1968	1969	1970	1971	1972	1973	1974
65	Missouri - Eastern	7.4	9.9	7.4	5.0	5.0	5.0	7.2
66	Missouri - Western	8.3	10.6	9.5	8.3	6.3	8.1	8.9
67	Nebraska	22.4	18.9	17.9	19.3	17.3	12.5	14.5
68	North Dakota	17.1	16.1	12.8	9.8	15.8	14.3	14.3
69	South Dakota	17.2	13.3	15.2	18.6	9.0	11.6	12.1
70	Alaska	15.5	13.8	12.3	14.0	11.7	6.6	14.2
71	Arizona	18.0	10.6	7.0	5.4	6.3	9.2	8.3
72	California - Northern	18.7	17.0	19.5	16.0	15.0	15.9	16.5
73	California - Eastern	15.5	13.3	11.4	16.0	10.3	15.6	12.5
74	California - Central	13.2	11.6	9.3	8.5	10.7	9.1	7.0
75	California - Southern	18.4	11.0	3.4	9.0	8.0	10.4	
76	Hawaii	22.4	17.7	19.6	15.8	12.0	12.0	11.0
77	Idaho	11.4	9.5	14.4	11.0	14.6	12.1	9.1
78	Montana	12.2	12.1	11.2	13.4	11.0	10.4	12.9
79	Nevada	10.0	12.4	12.2	7.5	9.0	10.2	13.2
80	Oregon	11.1	10.5	10.8	10.9	10.4	11.5	11.3
81	Washington - Eastern	12.1	9.4	8.0	7.6	6.6	8.8	9.8
82	Washington - Western	11.8	10.8	11.6	7.5	10.4	11.3	10.6
83	Colorado	9.4	11.2	9.8	10.3	12.2	11.8	10.6
84	Kansas	16.1	14.6	14.9	12.8	15.4	12.5	10.0
85	New Mexico	8.8	5.9	8.6	11.2	6.8	7.0	7.4
86	Oklahoma - Northern	5.6	7.9	7.8	6.6	7.9	6.1	6.1
87	Oklahoma - Eastern	6.3	8.2	8.4	8.9	7.4	8.2	6.4
88	Oklahoma - Western	6.0	7.6	6.1	5.2	5.3	4.6	4.7
89	Utah	6.2	10.3	11.0	8.4	10.7	12.5	10.5
90	Wyoming	7.6	8.8	5.8	8.5	9.1	8.6	7.9

TABLE B-5

Correlation Matrix of Variables Used in Court Delay Analysis

			1	2	3	4	5	6	7	8
1)	CRDELAY	1968	--	.45	-.20	.01	-.23	-.03	.33	.26
		1969	--	.54	-.28	.02	-.27	-.01	-.10	-.13
		1970	--	.52	-.36	.07	-.36	.03	-.08	-.04
		1971	--	.42	-.39	-.08	-.38	-.04	-.24	-.22
		1972	--	.46	-.38	-.01	-.38	.01	-.28	-.20
		1973	--	.48	-.25	.03	-.33	.07	-.17	-.02
		1974	--	.40	-.23	-.11	-.35	-.06	-.22	-.16
2)	CVDELAY	1968		--	-.15	-.09	-.13	-.14	.14	.44
		1969		--	-.19	-.03	-.17	-.07	-.09	-.09
		1970		--	-.33	.03	-.12	-.33	-.21	-.19
		1971		--	-.20	-.14	-.24	-.19	-.24	-.22
		1972		--	-.29	-.04	-.26	-.06	-.19	-.17
		1973		--	-.23	.17	-.19	.03	-.14	-.03
		1974		--	-.10	.17	-.20	.10	-.03	.04
3)	CRDEQJ/J	1968			--	.22	.97	.25	.75	.15
		1969			--	.03	.97	.02	.44	.50
		1970			--	.10	.99	.18	.68	.65
		1971			--	.11	.97	.02	.66	.64
		1972			--	.04	.96	.01	.57	.54
		1973			--	.01	.91	.02	.47	.36
		1974			--	.42	.65	-.11	.18	.27
4)	CVDEQJ/J	1968				--	.12	.97	.24	.73
		1969				--	.05	.93	.70	.65
		1970				--	.12	.93	.60	.60
		1971				--	.06	.88	.63	.64
		1972				--	.05	.83	.56	.67
		1973				--	-.04	.83	.60	.52
		1974				--	-.10	.41	.29	.34
5)	CRDEQJ/J	1968					--	.16	.73	.09
		1969					--	.06	.43	.49
		1970					--	.21	.66	.64
		1971					--	-.03	.62	.61
		1972					--	.06	.55	.54
		1973					--	.01	.41	.34
		1974					--	-.05	.31	.38
6)	CVDEQJ/J	1968						--	.18	.36
		1969						--	.63	.58
		1970						--	.64	.67
		1971						--	.48	.53
		1972						--	.41	.60
		1973						--	.64	.75
		1974						--	.59	.73

				8
7)	CRPEQJ/J	1968	--	.36
		1969	--	.97
		1970	--	.95
		1971	--	.96
		1972	--	.91
		1973	--	.85
		1974	--	.84
8)	CVPEQJ/J	--		--

Variables:

1) Median criminal defendant court processing time

2) Median civil case court processing time

3) Criminal output in equivalent judge units per available judge

4) Civil output in equivalent judge units per available judge

5) Criminal cases filed during the year in equivalent judge units per available judge

6) Civil cases filed during the year in equivalent judge units per available judge

7) Criminal cases pending at the start of the year in equivalent judge units per available judge

8) Civil cases pending at the start of the year in equivalent judge units per available judge

TABLE B-6

Correlation Matrix of Variables Used in Cross-section Judicial Productivity Analysis

			1	2	3	4	5	6	7	8	9	10	11
1)	OEQJ/JAV	1968	-	.93	.01	.88	-.12	.03	.19	.18	.01	-.28	--
		1969	-	.10	.07	.85	-.27	.08	.48	-.21	.07	.13	--
		1970	-	.06	.03	.89	-.26	.05	.56	-.32	.05	.20	.21
		1971	-	.10	.06	.83	-.15	.02	.25	-.15	.01	.19	.36
		1972	-	.10	.03	.79	-.14	-.17	.26	-.09	-.15	.06	.31
		1973	-	.12	.09	.77	-.19	-.11	.20	.08	-.05	.13	.25
		1974	-	-.09	-.11	.77	-.14	-.05	.07	.01	-.06	.17	.39
2)	JUDAVAIL	1968		-	.93	.15	-.14	-.03	.21	.20	-.04	-.33	--
		1969		-	.94	.29	-.18	.02	.31	.18	-.06	-.35	--
		1970		-	.93	.18	-.13	-.10	.20	.23	-.09	-.36	.11
		1971		-	.93	.27	-.21	-.08	.24	.13	-.13	-.35	.14
		1972		-	.94	.18	-.18	-.03	.31	.06	-.10	-.32	.11
		1973		-	.92	.10	-.20	-.07	.34	.11	-.11	-.23	.15
		1974		-	.92	-.06	-.20	-.04	.28	.17	-.14	-.33	.07
3)	JVDAV**2	1968			-	.16	.06	.03	.19	.18	.03	-.28	--
		1969			-	.26	-.12	.06	.29	.15	-.01	-.31	--
		1970			-	.16	-.05	-.04	.15	.18	-.03	-.30	.06
		1971			-	.25	-.16	-.03	.19	.12	-.07	-.34	.04
		1972			-	.16	-.10	.01	.22	.07	-.06	-.32	.05
		1973			-	.08	-.16	-.07	.23	.14	-.13	-.26	.05
		1974			-	-.06	-.16	-.07	.18	.20	-.19	-.30	.01

		1	2	3	4	5	6	7	8	9	10	11
4) WEQJ/JAV	1968				-	-.09	-.17	.49	-.01	-.30	.07	--
	1969				-	-.28	-.28	.50	.01	-.23	-.05	--
	1970				-	-.29	-.08	.54	-.12	-.13	.02	.13
	1971				-	-.26	-.14	.22	.01	-.20	-.03	.30
	1972				-	-.22	-.29	.23	.10	-.27	-.09	.23
	1973				-	-.30	-.25	.19	.19	-.23	-.03	.23
	1974				-	-.20	-.22	.09	.14	-.16	-.05	.26
5) CV%TRWTD	1968					-	-.24	.20	.28	-.18	-.10	--
	1969					-	-.08	.11	.20	-.16	.01	--
	1970					-	-.17	.09	.35	-.19	.09	-.07
	1971					-	-.10	.26	.40	-.09	.22	-.15
	1972					-	-.07	.13	.40	-.12	.12	-.11
	1973					-	-.08	.28	.40	-.15	.18	-.19
	1974					-						
6) CR%TRWTD	1968						-	.03	.62	.32	.05	--
	1969						-	.22	-.58	.27	-.01	--
	1970						-	.20	-.59	.33	.14	.25
	1971						-	.14	-.48	.36	.05	.10
	1972						-	.07	-.50	.50	.01	.07
	1973						-	.07	-.57	.31	.07	.06
	1974											

		1	2	3	4	5	6	7	8	9	10	11
7) TRD/JAV	1968							-	.06	-.10	-.29	--
	1969							-	-.07	-.11	-.38	--
	1970							-	-.10	-.06	-.16	.25
	1971							-	.02	-.05	-.22	.08
	1972							-	.02	-.05	-.31	.06
	1973							-	.11	-.05	-.28	.10
	1974											
8) CVEQ/TEQ	1968								--	-.18	-.28	--
	1969								--	-.23	-.18	--
	1970								--	-.31	-.24	-.21
	1971								--	-.36	-.01	-.16
	1972								--	-.38	-.09	-.07
	1973								--	-.36	-.09	-.13
	1974											
9) %DEFWAC	1968									--	-.07	--
	1969									--	-.01	--
	1970									--	-.01	.20
	1971									--	-.01	.07
	1972									--	-.07	.06
	1973									--	-.03	.25
	1974									--	.16	.17

			1	2	3	4	5	6	7	8	9	10	11
10)	PLHLDCT	1968										--	--
		1969										--	--
		1970										--	-.05
		1971										--	-.06
		1972										--	.06
		1973										--	-.03
		1974										--	-.15
11)	MAG/JAV	--											--

Variables:

1) Output in equivalent judge units per available judge

2) Judges available

3) Judges available squared

4) Workload in equivalent judge units per available judge

5) Percent of civil cases disposed by trial weighted by civil workload as a percent of total workload

6) Percent of criminal cases disposed by trial weighted by criminal workload as a percent of total workload

7) Trial days per available judge

8) Civil output in equivalent judge units as a proportion of total output

9) Percent of criminal defendants with assigned counsel

10) Number of places of holding court

11) Number of full time magistrates per available judge

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