Can Courtroom Sharing Reduce Courthouse Construction Costs? A Preliminary Review

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The federal government has a large backlog of office and other space needs. Some policymakers argue that more sharing of courtrooms by federal judges would lower courthouse construction costs and free resources for other purposes. Others worry that sharing of courtrooms would increase trial delays and other costs. Decision makers employ a variety of techniques to better understand and to help guide decisions about issues like courtroom sharing. This analysis applies one such technique to simulate the flow of trials through a federal court system and to assess the impact on trial delays of providing less then one courtroom per judge. The preliminary findings suggest no significant impact.

SUMMARY AND INTRODUCTION

President Clinton's budget for 2001 includes $488 million for courthouse construction. Currently, most federal district judges have their own courtroom, and the budget urges the judiciary to consider more actively the sharing of courtrooms by judges in planning space needs.[1] It also states that future funding will be dependant on the extend to which it complies. (Sharing of courtrooms in this analysis means that different judges may preside at different times in the same courtroom.) Policy and budget makers have long urged the judiciary to adopt more sharing because it would reduce the need for expensive new court-

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1. Each state has at least one district court, which is the trial court of general federal jurisdiction. The 50 states have 89 district courts, and the District of Columbia and the Commonwealth of Puerto Rico each have one. Some courts, including those in New Mexico, already share courtrooms. Sharing also occurs, in some areas, among semiretired judges, who continue to preside at some trials and are referred to as senior judges.

rooms. Most recently a study by Ernst and Young recommended more sharing of courtrooms by senior and other judges.[2] The issue has also been the subject of studies by the General Accounting Office (GAO) and the Congressional Budget Office. A 1997 GAO report added urgency to calls for more courtroom sharing by finding that, under current practice, courtrooms examined in seven cities were occupied only 54 percent of the available workdays.[3]

The potential savings in courthouse construction costs through courtroom sharing are large. According to Ernst and Young, courtrooms make up nine percent of courthouse space but account for 25 percent of courthouse construction costs. The Office of Management and Budget (OMB) estimates the average cost of a courtroom at $1.5 million, and the judiciary's long-range plan, according to Ernst and Young, calls for the construction of over 200 new courtrooms. Reducing the costs of construction could free resources for the large and growing inventory of other public building needs.

The judiciary has resisted calls for more courtroom sharing for a number of reasons. One problem, it argues, is that the sharing of courtrooms could lead to more trials and thus, to more trial delays. According to that view, available courtrooms make the threat of a trial more concrete to litigants and therefore encourage them to settle out of court. Also, sharing complicates the scheduling process and increases the likelihood of problems such as the overbooking of courtrooms. The judiciary also notes that courtroom sharing would increase court costs because it would require, among other things, additional staff to handle scheduling.

Ideally, the courts would strike the right balance between the savings associated with sharing courtrooms and the costs associated with delays, scheduling, and any other concerns. This analysis contributes to such an effort by considering the frequency and length of trial delays under an expanded program of courtroom sharing. In so doing, it also illustrates an analytical technique of use in planning space and other needs. The analysis finds that increased sharing of courtrooms by judges would not necessarily cause significant trial delays, as critics of the practice have contended. The analysis has important limitations, however, and firmer conclusion would require further research.

Analytic Method

Courts, like other organizations, often face decisions about the amount of capacity to provide to meet the demand for services. Providing too much capacity leads to extra costs—for example, idle employees and equipment. Providing too little can lead to long waits and, in turn, to such problems as dissatisfied clients and lost business. Ideally, an or-

2. Ernst and Young, *Independent Assessment of the Judiciary's Space and Facilities Program* (Washington, D.C.: Ernst and Young, 2000).

3. General Accounting Office, *Courthouse Construction: Better Courtroom Use Data Could Enhance Facility Planning and Decisionmaking*, GAO/GGD-97-39 (Washington, D.C., May 19, 1997).

ganization strikes the right balance between the conflicting objectives of minimizing cost and maximizing service.

A variety of techniques is available to help guide decisions about things like the amount of capacity to put in place. One technique is simulation modeling. Under the version of that technique used here, actual performance of a system or a policy, for example, a policy to increase courtroom sharing, is estimated using a simplified mathematical representation of the real process, in this case the use of space by a federal court. Models often involve extensive data processing and are therefore represented on computers. Simulation models offer the opportunity to test and experiment with a system, without the costs and other problems that arise when tests and experiments involve real systems. Results of simulations are generally not sufficient for answering questions about capacity or other matters. They do, however, provide useful information for guiding decisions.

The General Purpose System Simulation Software used in this analysis is suitable for modeling a queuing system, that is, a system in which customers wait for service.[4] Such models assume that certain events, such as the number of cases arriving for trial in a given period, occur randomly but around averages and within ranges specified by users. Those averages and ranges are often based on observations of real events. The queuing system modeled here is, of course, cases and litigants waiting for a courtroom. However, the same model could be used, for example, to assess the impact on the amount of time patients will have to wait if another doctor is added to a hospital emergency room, or on the amount of time claimants will wait if the number of claims representatives in an office is decreased.

One can think of the simulation model as working in the following manner. It projects trials at random intervals and assigns lengths to those trials. It selects those trial intervals and lengths from predetermined distributions based on 1995 data collected by GAO for the 10 courtrooms of the district court in Denver, Colorado.[5] The model then estimates the likely flow of trials through the system and reports on the performance of the court system. Performance is measured in terms of the percentage of days a courtroom is used, the percentage of trials delayed, and the average delay (measured as the number of days a trial is postponed). By varying the model's basic assumptions, we tested the effect of courtroom sharing on the performance of the simulated court system.

The model assumes that courtrooms are empty when the simulation begins and then works through its calculations until the system reaches a steady state. It computes statistics on delays and utilization rates for that steady state; its results are averages over many simulations. All delays are assumed to be caused by the lack of a courtroom. Delays are measured from the time a trial would have been expected to begin had a courtroom been available. The analysis consists of several different simulations, each of which is described later in this article.

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4. The software is from Wolverine Software Corporation of Annandale, Va.

5. The model requires no specific input for the number of judges. Rather, it assumes sufficient hours of work to deal with the assumed number of trials.

Limitations of the Analysis

The simulations in this study focus solely on the narrow question of courtroom sharing. Many other considerations, such as the number and complexity of trials, enter into planning court space for the judiciary. And even with regard to courtroom sharing, the analysis addresses only the possible consequences that sharing has on trial delays. Other effects are not considered: for example, a possible decline in the morale of judges, who often think of courtrooms as personal work spaces, or the security concerns that may arise as criminal defendants are moved around in courthouses.

The simulations by themselves only suggest that in some situations, courtroom sharing would not cause major trial delays. They do not prove this assertion, however, because like any simulation, the ones used in this analysis could not take into account all of the relevant factors that affect trial delays and the use of courtrooms. Among other things, the simulations could not take account of the conditions particular to courts of varying sizes and in different locations (variations from area to area in workload, court rules, and legal cultures, for example). Accordingly, the model's results cannot be assumed to apply equally to all courts. Moreover, trials place widely varying demands on resources depending on the type of trial (for instance, civil or criminal, jury or nonjury) and its circumstances and complexity. The simulations presented here are based on a pattern of trials observed in one district court system, Denver's, during a single year, 1995. That pattern may not be typical, but there is also no evidence that it is not. Future analyses could consider other court districts and distinguish among types of trials.

The simulations do, however, improve on earlier efforts in several respects. Among other things, they incorporate data on actual trials and take trial-related activities—for example, pretrial conferences, hearings on motions, and sentencing—into account. (In the absence of data linking trial-related activity to specific trials, the analysis here assumed that trial-related activity was the same for all trials.) They also add a large margin of extra time to the length of the trials in recognition of the many variables that the model does not account for. (As explained in more detail later, that extra time comes from counting a courtroom used for any part of a day as occupied for the entire day.) After incorporating those adjustments, the simulations indicate that courtroom sharing should not be dismissed out of hand because of concerns about delays. They also suggest that additional analysis is warranted and illustrate one among several possible analytic methods for conducting a more comprehensive review.

SIMULATING A COURT SYSTEM

As a first step, we adapted a mathematical model to simulate a court system patterned after Denver's in 1995. (That model then served as the baseline for measuring the impact of more courtroom sharing.) Using GAO's 1995 data on Denver trials, the simulation produced a utilization rate of 52.75 percent, which is virtually identical to GAO's results. The utilization rate in that base case simulation is the average for 100 runs of the simulation.

For those runs, delays occurred, on average, in only one-half of one percent of all trials and averaged well under half a day in length. Thus, essentially, no trials were delayed in the base case simulations.

The analysis made several critical assumptions as inputs to the statistical model. First, it assumed that a new trial started in one of the 10 courtrooms in Denver's U.S. courthouse, on average, every 1.02 days.[6] In developing a specific distribution of trial starting times around the average to use in the simulations, the actual distribution of times was taken from GAO's data. Those data showed one new trial beginning on most days in 1995. Only rarely did several trials start on the same day. We determined that a beta distribution best characterized that pattern.

Second, the analysis assumed that an average trial lasted 5.41 days. We arrived at that duration by dividing the number of days courtrooms were occupied in 1995 (according to GAO's data) by the number of trials. The data show that most trials lasted a few days but some took up to two weeks, and the statistical distribution (a gamma distribution) of trial lengths around the average that we chose for the model followed that pattern. (Cities other than Denver may show different distributions.)

Data on trial lengths included the time that courtrooms were used for trial-related activities. Under GAO's approach, the duration of a trial was also measured in such a way that a courtroom used for any part of a day was assumed to be used for the entire day. (For example, GAO's data reported a courtroom occupied with a trial for a single hour on two consecutive days as occupied with that trial for two full days.) The additional time incorporated in trial lengths imparts a conservative bias to the model's results, which means that the model probably overstates the impact of courtroom sharing on trial delays. The extra time is significant. To illustrate, consider that the utilization rate of almost 53 percent that GAO computed for Denver in 1995 incorporates that extra time. However, data show that courtrooms were actually occupied—excluding the extra margin—for only 20 percent of the available time.

Third, the analysis assumed that trials could begin and end at any time during a workday. In reality, scheduling trials one after another in the same room may be difficult. However, the margin of extra time added to trial lengths helps take such scheduling problems into account.[7]

SIMULATING COURTROOM SHARING

To simulate the effect of courtroom sharing, we took the base case model and ran several simulations that varied the assumptions about the number of courtrooms in Denver and

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6. That figure is simply the number of workdays in the year (250) divided by the number of trials in 1995 (245). The estimate of the number of trials is based on the best data available, which were consistent with information from the Administrative Office of the U.S. Courts and GAO.

7. To account for scheduling problems, simulations were run that added a half-day margin to trial lengths in addition to the margin already included in GAO's data. These simulations did not change the basic conclusion that courtroom sharing would not necessarily increase trial delays.

the number of trials in 1995. The simulations all incorporated the basic assumptions about trial lengths described above. The analysis found that in most instances, courtroom sharing in Denver would delay less than five percent of all trials.

In one of the approaches used, a simulation was run using an assumption of fewer than 10 courtrooms while holding the number of trials at their 1995 level. (That approach simulates courtroom sharing, because it corresponds to assigning more trials and their judges to each courtroom.) First, we simulated the consequences of having nine rather than 10 courtrooms, which represents a modest amount of courtroom sharing. Under the nine-courtroom assumption, the rate of utilization would rise from 52.75 percent of available workdays (10 courtrooms) to 58.79 percent of available days (nine courtrooms) (see Table 1). According to the simulation, the percentage of trials that were delayed would rise from the estimated current level of almost none to 2.26 percent, and the average delay for those trials would be about half a day. If the model assumed eight courtrooms, utilization would increase to 65.74 percent of available workdays, and the percentage of trials delayed would rise to just over 7.36 percent, with delays averaging just over half a day. If the number of courtrooms dropped to seven, 23 percent of trials would be delayed by less than a full day, on average.

Another approach to modeling courtroom sharing assumes a greater number of trials but the same number of courtrooms and trials per judge. (As with the previous simulations, the assumptions made here simulate courtroom sharing because it corresponds to more judges and their trials in each courtroom.) The simulations suggest that sharing would allow Denver's system to absorb a 25-percent increase in its caseload relative to the 1995 level with a small number of delays (see Table 2). (As a reference, data from the Administrative Office of the U.S. Courts show a recent boost in annual caseloads for federal courts averaging two percent a year.) Even with a 25-percent increase, courtroom use would rise to only 63.45 percent of available days; that is, courtrooms would still be unused for almost 40 percent of the available time. The percentage of trials that were delayed would increase to 3.96 percent, but the length of the delays would still be about half a day.

TABLE 1
Impact of Increased Courtroom Sharing Assuming Different Numbers of Courtrooms

	Current Ten-Courtroom System	Assumed Alternate Number of Courtrooms		
		Nine	Eight	Seven
Percentage of Days Courtroom Used	52.75	58.79	65.74	75.27
Percentage of Trials Delayed	0	2.26	7.36	23.00
Average Number of Days Trials Delayed	0	0.52	0.56	0.90

Source: Congressional Budget Office, based on data provided by the General Accounting Office.
Note: Percentages are averages over many simulations. Delays are averages per trial postponed.

TABLE 2
Impact of Increased Courtroom Sharing Assuming Different Numbers of Trials

	Current Caseload	Assumed Percentage Increase in Caseload		
		10	15	25
Percentage of Days Courtroom Used	52.75	57.90	61.00	63.45
Percentage of Trials Delayed	0	1.40	2.10	3.96
Average Number of Days Trials Delayed	0	0.48	0.45	0.51

Source: Congressional Budget Office, based on data provided by the General Accounting Office.
Note: Percentages are averages over many simulations. Delays are averages per trial postponed.

RESOLVING THE ISSUE OF COURTROOM SHARING

The results of the simulations are not sufficient to resolve the question of the desirability of courtroom sharing. They only illustrate a method of estimating one possible cost of sharing: delays. They also offer insight into the likely size of that cost. The wisdom of pursuing more courtroom sharing depends on a range of possible costs and benefits. Those might include, in addition to the cost of delays, the cost of additional staff required for the added scheduling that sharing may involve. Possible benefits would include reductions in courthouse construction costs and in heat, light, cleaning, and other operating and maintenance costs. An earlier study found that the cost of delays could be significant depending on assumptions about workload.[8] The study showed that delays and other costs can, in some cases, outweigh the benefits of courtroom sharing.

If future studies showed a net savings from more courtroom sharing, those savings could contribute to other public building needs, and those needs are substantial. The resources required by the General Services Administration's (GSA's) Public Building Service to construct, repair, rent, heat, light, and maintain space for federal operations total over $7 billion per year. The Public Buildings Service and its Federal Buildings Fund, which finances federal space needs out of rental income, have struggled to meet growing demands for construction, repairs, alterations, and other requirements. In part, that growing demand is caused by the aging of federally owned space. About half of all such space is now over 40 years old.

GSA has struggled to keep abreast of federal space needs in part because of funding limitations. The volume of pending work underscores the importance of fully exploring opportunities to make full use of the limited resources available. The GAO recently esti-

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8. Edward H. Leekley and William T. Rule, *The Impact of Providing Fewer Than One Courtroom per Judgeship* (Washington, D.C.: Judicial Conference of the United States, 1996).

mated that needed repairs and alterations in federal space will cost an estimated $4 billion.[9] GAO found that in one-third of buildings examined, major repairs and alteration had been delayed for from three to 15 years. GSA officials admit that conditions in many federal buildings are far from ideal and that some cannot support 21st-century operations. In addition, GSA reports a growing list of pending building construction projects totaling billions. Courthouse construction projects alone total about $2 billion.

Courtroom sharing may offer one approach to making fuller use of the limited resources available to meet a growing inventory of federal space needs. This article demonstrates that further investigation of that possibility is warranted.

NOTES

9. U.S. General Accounting Office, *Federal Buildings: Billions Are Needed for Repairs and Alterations,* GAO/GGD-00-98 (Washington, D.C., March 2000).