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Chapter 15
"Public Sector Innovations and Their Diffusion: Economic Tools and Managerial Tasks"
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CHAPTER FIFTEEN

Public Sector Innovations and Their Diffusion:
Economic Tools and Managerial Tasks

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THIS CHAPTER is about public sector effectiveness. The focus is on the management of innovations and their diffusion, and how this affects the value of public services delivered. Three major themes guide the analysis: (1) the importance of the details of operating procedures and organizational settings, (2) the economic tools available to link these detailed choices to their effectiveness consequences, and (3) the managerial challenge to maintain or improve the success of an innovation when adapting it to suit a particular locality. These themes are illustrated via an examination of the diffusion and effectiveness of pretrial release units in local criminal justice systems throughout the United States.

For at least the past half-century, critics of bail in the criminal justice system have argued that the bail process results in unnecessary pretrial detainment of the poor. In practice, it operates much like a market system for the buying and selling of pretrial freedom. An arrested individual will be detained unless he or she chooses to purchase pretrial release. The price of release is set by a judge or magistrate, who determines a bond amount to be posted with the court. Defendants may post bond with their own resources, or they may apply for a loan in specialized capital

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markets known as the bail bond industry. The bondsmen charge 10 percent of the bond amount as their fee, sometimes supplementing this with collateral requirements.

Two criticisms of this system are especially relevant to the formation of pretrial release agencies. First, the judge or magistrate, in determining the bond amount, does so primarily by the seriousness of the offense charged. William M. Landes presented empirical evidence that no relation exists between seriousness of offense and probability of appearance in court if released.[1] In other words, the information used by the judge is not appropriate to aid in achieving the appearance objective. Second, indigent defendants do not have the resources necessary to purchase their freedom and are, therefore, detained regardless of their probabilities of appearance.

One could imagine the possibility of altering the information that enters into the judicial calculus in such a way that decisionmaking would be improved on both scores: Release criteria could be better related to the probability of appearance, and the criteria might reduce dependence on the accused's own financial resources. In 1960 precisely such an innovation was attempted in New York City—the Manhattan Bail Project, undertaken by the Vera Institute of Justice. The idea behind the project was that individuals with "strong community ties" have a sufficiently high probability of appearing that they could be safely released on their own recognizance (ROR), without any financial incentives.[2]

The innovators designed a simple questionnaire (see figure 15-1), used it to conduct ten-minute interviews with indigent defendants before their bail hearing, and attempted to verify the answers over the telephone by checking with family or friends of the accused. Those with a certain number of verified community ties (for example, length of residence, presence of family, employment history) qualified to be recommended for ROR at the bail hearing. In the initial demonstration, those qualified for ROR recommendation were randomly assigned to an experimental or control group. The experimentals were recommended, while controls had the bail hearing in the ordinary way, with no court knowledge of their participation in the experiment. The court did grant ROR to 59 percent of the experimentals, while only to 16 percent of controls. Of all those RORd by the project's recommendation, only 1.6 percent failed to appear

1. Landes (1974).

2. The development of this innovation, its diffusion across the country, and its effectiveness over time in New York City are discussed in Friedman (1976).

Figure 15-1. *Manhattan Bail Project Point Scoring System*

To be recommended, defendant needs:
1. A New York area address where he can be reached, and
2. A total of 5 points from the following categories:

	Interview	*Verified*
Prior record		
No convictions	1	1
One misdemeanor conviction	0	0
Two misdemeanor or one felony conviction	-1	-1
Three or more misdemeanor or two or more felony convictions	-2	-2
Family ties (In New York area)		
Lives in established family home and visits other family members (immediate family only)	3	3
Lives in established family home (immediate family)	2	2
Employment or school		
Present job 1 year or more, steadily	3	3
Present job 4 months or present and prior 6 months	2	2
Has present job that is still available or unemployed 3 months or less and 9 months or more steady prior job or unemployment compensation or welfare	1	1
Presently in school, attending regularly	3	3
Out of school less than 6 months but employed or in training	2	2
Out of school 3 months or less, unemployed and not in training	1	1
Residence (in New York area steadily)		
1 year at present residence	3	3
1 year at present or last prior residence or 6 months at present residence	2	2
6 months at present and last prior residence or in New York City 5 years or more	1	1
Discretion		
Positive, over 65, attending hospital, appeared on some previous case	+1	+1
Negative—intoxicated—intention to leave jurisdiction	-1	0

TOTAL INTERVIEW POINTS
REC. NOT REC.
INTERVIEW VERIFIED
RECOMMENDED NOT RECOMMENDED

(FTA). The FTA rate for those bailed in New York City at the time was 4 percent, so the project was thought to be enormously successful.

The experiment was then institutionalized in New York City's Office of Probation, while other similar projects diffused to more than one hundred communities across the country, largely through the stimulus of a series of national conferences. Over time in New York, the effectiveness of the reform deteriorated. First, the failure-to-appear rate relative to bail rose dramatically. While the skip rate for those bailed remained at about 4 percent, those recommended and RORd had, by 1967, an FTA rate of more than 9 percent. Second, the rate of judicial acceptance for those recommended fell from a high of 70 percent to 32 percent—almost equal to the 28 percent RORd from those interviewed but not recommended. No evidence emerged of similar deterioration by 1970 in the Washington, D.C., bail reform operation, which started as a demonstration in 1963 and became institutionalized in an independent agency.[3]

Although the Manhattan Bail Project was widely taken as proving that those with sufficient community ties can be trusted to appear, the experiment demonstrated nothing of the kind. No investigation was made of the determinants of appearance. Possibly the questionnaire used does successfully discriminate among defendants by their tendencies to appear. Another (though not necessarily inconsistent) possibility is that the follow-up procedures, used by the project for those released on their recommendations, caused the low FTA rate. These procedures included a mailed notification, in the defendant's own language, of when and where to appear. They were required to report to the project office by 9 a.m. of the day of appearance. If they did not appear, telephone calls were made in an attempt to locate them, and field visits were made if necessary. Because all of these procedures were part of the original demonstration, it is not known is if any (or all) of them are unnecessary or inefficient.

Similarly, the experiment did not provide any evidence about the determinants of judicial acceptance of the project's recommendations. Perhaps it was the appearance by a Vera staffer at arraignment that precipitated the judicial acceptance, instead of anything substantive (that is, the results from the interview and verification process). Perhaps any randomly selected set of defendants who were all recommended for ROR by Vera staffers at arraignment and subject to the Vera follow-up procedures

3. Friedman (1976).

would achieve the same results. The experimental success reveals neither whether the interview and verification procedures had anything to do with it nor whether the released individuals were any more or less trustworthy than the average arrestee.

The Vera Institute of Justice created a successful innovation. Although its operating procedures may be simple to describe, the extent to which any particular aspect of these procedures may have contributed to (or retarded) the success of the innovation was unknown. Nevertheless, the reform (or various versions of it) did diffuse to many jurisdictions around the country. The effectiveness of the reform in these jurisdictions is not well understood. Studies were conducted of particular jurisdictions documenting, for example, deteriorating performance in New York City and the absence of deterioration in Washington, D.C., during comparable periods.

The Economic Tool: Understanding the Procedures That Determine Agency Effectiveness

A pretrial services agency operating a Vera-like reform has many choices about how to allocate and use whatever scarce budgetary resources are available. Choices must be made about the procedures and resources for interviewing, verifying types of recommendations possible, ensuring appearance, and trying to learn or study how to increase the agency's effectiveness. The manager of the agency has primary responsibility for making these choices. The manager does not usually have complete discretion; the court system in which the agency operates may choose to require or veto particular procedures. Thus the true extent of the manager's discretion depends on the latitude secured from the court, and this in turn may depend on the political skills of the manager.

To study the effects of these choices, I have taken advantage of two independent national surveys of pretrial release agencies: one by the Office of Economic Opportunity's Legal Institutions Division in the beginning of 1973; the other by the National Center for State Courts in the beginning of 1975. Both surveys gathered information about the budgets, operating procedures, and outputs (in terms of RORs and FTAs) of all agencies known to be operating. The appendix contains more detail about this data, its limitations, a description of the technical procedures used to analyze it, and the results.

Table 15-1. *Important Policy Choices for Pretrial Service Agencies*

Parental choice	*Vera response*
Interviewing	
1. Use point system?	Yes
2. If yes, allow subjective judgment?	No
3. Conduct interview when? (Before bail hearing, after, or both)	Before
4. Restrictive eligibility criteria?	Yes → No
Verification	
5. Try to verify defendant's responses?	Yes
6. If yes, field visits when necessary?	Yes
Type of recommendations made	
7. ROR only (or cash bail, ordinary bail, third party)?	Yes
ROR follow-up procedures	
8. Notify defendants of required appearances?	Yes
9. If yes, require acknowledgment?	No
10. Require defendants to call in regularly?	No
11. Day of appearance effort?	Yes
Learning	
12. Gather data and analyze it?	Yes
13. Invest in computerized information system?	No

Note: ROR = released on own recognizance.

In conducting interviews, virtually all agencies use standardized forms and questions at least somewhat similar to the original Vera form shown in figure 15-1 (see table 15-1). One important set of procedural choices is whether or not to use a point system to score a defendant's responses and to serve as the basis for making a recommendation decision. A second important procedural choice concerns the timing of the interview—whether it is conducted before the initial bail hearing, after it, or, in some cases, at both times. A third important choice concerns eligibility criteria: whether or not to exclude individuals accused of particular types of crimes (for example, felonies, violent crimes).

The intensity of an agency's effort to verify interview responses is another important choice an agency manager faces. Verification efforts can be restricted to telephone calls to family, friends, or employers or can include personal interviews. More resources allocated to verification will increase the accuracy with which community ties are assessed but presumably will reduce resources available both for interviewing and follow-up procedures.

The original Vera project only considered whether or not to recommend ROR. However, some agencies utilize other options in addition to ROR. Some may recommend that ordinary money bail be set for certain defendants. Some consider recommending release under the supervision of a third party. Other agencies may use the option of recommending a cash deposit (a low-cost alternative to ordinary bail). These options complicate the decision of what to recommend for any particular defendant, and the success of them depends both on whether such sorting can be meaningfully done and whether the agency attempting this is able to do so.

Follow-up procedures for ROR defendants may consist of four activities: systematically notifying defendants of their required court appearances, requiring acknowledgment by the defendant of the notification, requiring defendants to call in or report to the agency at regular intervals, and requiring defendants to contact or meet with agency personnel on the days of scheduled appearances. If an agency chooses none of these procedures—as many in the survey did—the implication is that normal court procedures will be relied upon to ensure a defendant's appearance. This choice is consistent with beliefs that the agency is identifying those who can be trusted to appear because of their strong community ties and that normal court notification procedures are adequate.

To learn or study about increasing the agency's effectiveness, managers could undertake a wide variety of efforts. Here, I focus on those that might require enough resources to reduce measurably (in the short run) the resources available for operations. The primary effort that I could identify from the questionnaires was in terms of data gathering.

To produce certain statistics, the agency has to systematically gather the necessary data. For example, many agencies gathered the data necessary to report the court dispositions of RORd defendants. Why would a manager divert scarce resources away from operations to do this? Understanding the effects of following the agency's recommendations could provide persuasive evidence to use in securing, maintaining, and increasing judicial cooperation and support. Similarly, agencies could choose to invest in computerized information systems (bearing in mind that personal computers did not exist during the 1970s) primarily for research purposes; these systems could be used as well for operations (such as the notification process), and the relevant case is when the system could not be cost-justified for operations alone.

Given all of these possibilities for use of the agency's scarce resources, what choices should a manager make? "Core choices" are

those that increase or decrease the effectiveness of many different agencies, despite the variation in local environments. Although a project manager normally has to adapt the reform in some ways to suit the local environment, adaptation in terms of these core choices should be strenuously resisted. "Noncore choices" are those that are not associated with any general systematic effects, or the effects go in opposite directions (for example, more releases but higher FTA rates). The latter may pose important choices but involve difficult value judgments. The standard interpretation of the first type of noncore choice is that it has no significant impact on an agency's effectiveness. A second, less likely interpretation is that a particular noncore choice is effective in certain local environments, but its opposite is equally effective in other local environments. This also would imply that no "average" effect is detectable. In any event, the noncore choice is adaptable. It can be determined in terms of suitability for the local environment.

Certain choices may be necessary given the specific local environment in which the agency operates. For example, the court may give the agency permission to interview only after the initial bail hearing instead of before. My categorization of core and noncore choices is independent of local considerations; certain agencies may be forced to make poor core choices.

To determine which choices are core and noncore, the data from the two surveys were used to estimate the effect of each choice on the number of releases achieved per budgetary dollar and on a standardized failure-to-appear rate. The estimation procedures for this production analysis are somewhat complex, involving the pooling of cross-section and times series data to estimate and test the validity of a three-part technology structure. Although the full results are reported in the appendix, two core choices are concentrated on here.

The two core choices identified by the statistical analysis are (1) the use of point systems and (2) the follow-up requirement that defendants call in or report in regularly. Their positive effects are unambiguous. Furthermore, their implementation depends primarily on the manager's choice.

Other variables, such as the timing of the interview and ROR authority for the project, are also revealed to have a substantial impact on the agency's output. However, changes in these procedures require court permission at a minimum. Furthermore, the impact that is associated with them generally does not separate the simultaneous effect of changing the pool of clients and changing the procedure per se. For example, inter-

viewing before the initial bail setting results in more releases (other things equal), but this does not mean the agency is truly more productive; it means it is working with a different and less risky client pool from the start. Whether or not this is appropriate for agencies to do involves a complicated question of values that is not addressed here.

Point systems and call-in requirements are used on the identical client pools. The use of a point system, compared with no point system, increases the number of interviews and the releases per interview as well as reduces the failure-to-appear rate. Substantial differences in effectiveness of a "representative" agency (one with characteristics at the sample means) are caused by this decision (see table 15-2). If the agency does not use a point system, its average cost per release will be $54.80. If it uses a strictly objective point system, this cost will drop in half to $27.53. Furthermore, the FTA rate will be reduced from 4.74 percent (no point system) to 2.19 percent. The cost per release can be reduced even further if a point system is used with some subjective judgment allowed, to $18.56, although the FTA rate is 2.64 percent—still much better than no point system, but slightly higher than the strictly objective system. Some value judgment is required to choose between the two types of uses of point systems (a noncore choice), but the use of a point system clearly greatly increases an agency's effectiveness.

Similarly, the call-in requirement also has advantages. The representative agency that does not require call-ins has a cost per release of $38.71. The same agency with a call-in requirement would reduce its cost per release by 31 percent to $26.65; furthermore, it would improve its FTA rate from 3.71 percent to 3.09 percent.

Changes in Industry Efficiency over Time

A key question to consider is the change over time in performance at the industry level. Although any single agency may improve while another may deteriorate, does the industry as a whole improve or deteriorate?

One way to examine the evolution is to count the number of agencies using the more efficient procedures and observe how this changes over time. To do this, the agencies are divided into three groups: survivors (those included in both surveys), missing (those only included in the first survey, probably because they did not survive), and new agencies (those only included in the second survey).

Table 15-2. *Point Systems and Call-In Requirements*

Policy choice	*Interviews (number)*	*Releases (number)*	*Cost per release (dollars)*	*FTA (percent)*
No point system	9,119	1,825	54.80	4.74
Points (objective)	12,519	3,632	27.53	2.19
Points (subjective)	10,119	5,389	18.56	2.64
Call-in	7,969	3,752	26.65	3.09
No call-in	12,469	2,584	38.71	3.71
Sample average	10,219	3,168	31.57	3.38

Note: Effects illustrated for average size agency. 1972 budget = $100,000. FTA = failure to appear.

Forty-seven observations on surviving agencies contain all the data necessary to estimate any changes in efficiency for this part of the industry. The use of the two efficient procedures by agency is shown in tables 15-3 and 15-4. In terms of point systems, about an equal number of agencies deteriorated as improved. The results on the call-in requirement are more dramatic, however. While no deterioration was evident, fourteen of the twenty-seven agencies not using this requirement at the time of the first survey had begun to use it by the second. This is consistent with a strong and rational evolutionary pattern of industry growth and development.

In addition, the data appear neutral with respect to rational selection for those agencies that were missing by the second survey. The early data on eight of these missing agencies are available. Of these eight, none was using efficient follow-up procedures. But if the missing agencies were simply chosen at random from those in the first survey, three with efficient follow-up would be expected. With respect to point systems, two did not use them. If these agencies were selected at random, three agencies were expected not to use them. Thus these appear to be a group close to the average efficiency level reported in the first survey.

Of the twenty-nine new agencies started since the first survey, eleven did not use point systems. Based on the first survey distribution, this is exactly the number of inefficient choices expected. Eleven did not use the call-in requirement. But based on the first survey distribution, one would expect eighteen not to use it. The new agencies are therefore more efficient, on average, than the industry during the first survey. Compared with surviving agencies during the second survey, however, they appear about as efficient. (One would expect twelve not to use point systems,

Table 15-3. *Use of Point Systems*

		Second survey	
		Yes	No
First survey	Yes	24	5
	No	4	14

Table 15-4. *Use of Call-In Requirement*

		Second survey	
		Yes	No
First survey	Yes	20	0
	No	14	13

eight not to use follow-up.) Thus these data are also consistent with rational growth and development.

The method of examining the evolution by simply counting ignores the possibility that the changes are not randomly distributed with respect to budget size. If all the largest agencies were the inefficient ones and those whose effectiveness decreased, and all the improvements were concentrated in the smallest agencies, the overall picture of evolution might be different. Therefore, I checked this with a procedure that takes budget size into account.

The average cost per ROR was $32.57 in both surveys (this includes some observations not usable for the earlier statistical analysis). At the time of the first survey, the average cost was $36.07. By the time of the second survey, this had decreased to $31.10, a drop in average industry "output" cost of 14 percent. Thus, over this two-year period, the industry had achieved productivity gains at the level of almost 7 percent a year, a rate that most private industries would envy.

This "cost improvement" analysis must be qualified by the recognition that increased releases are not the only "output" of the agencies. A

second important "output" is the level of pretrial misconduct of those released, here measured by the FTA rate. The efficient core procedures lead to better output levels in terms of both of these dimensions, but an attempt was not made to value the reductions in FTA achieved.

Taken together, these data are startling and important, for they suggest that public productivity does improve over time. Examining this in other areas and over longer time periods would be instructive.

The Mechanisms of Improvement

What might explain this evolution toward greater effectiveness? For those agencies that improved, the change could be initiated by their managers or staff or urged upon them by someone in their external environment. But what would cause these individuals to reach this conclusion? One possibility is vigorous managerial examination, perhaps motivated by some rough knowledge that other agencies achieve more releases and lower FTA rates. Do the managers of these agencies have incentives to improve their effectiveness? Perhaps the agency was formally evaluated, and the evaluatory process led to these conclusions. Still another possibility is the dissemination of social science studies (such as this one) urging that changes like these be made.

To a limited extent, I am able to explore some of these questions by making further use of the survey data. First, I ask whether any evidence exists that managers using the more effective techniques get rewarded with bigger budgets (appropriate for a young growth industry with agency budgets far below the level needed to serve the relevant pretrial populations). If the efficient agencies are expanded more rapidly than other agencies, this could create substantial imitation incentives in an industry with few barriers to the sharing of technical information. The answer appears to be yes, although it is not statistically significant. Average budget growth for these agencies over the two-year period was 49 percent. Inefficient agencies grew by 12 percent, agencies using one of the efficient core procedures grew on average by 48 percent, and agencies using both efficient core procedures grew by 86 percent.

To explore this further, I consider whether the type of agency overseeing the pretrial release unit makes a difference. For example, perhaps those units controlled directly by the courts experience rewards more closely connected to their effectiveness than do units controlled by pro-

bation departments. Again, the results of this analysis are suggestive but not statistically significant: Judicially controlled rewards are unrelated to effectiveness, while the positive relationship between effectiveness and budget growth is even larger for units overseen by nonjudicial agencies.

The above analysis considers whether rewards (budget levels for the second survey) depend on which agency is doing the rewarding. There is the other side of this relationship. Does agency behavior depend upon anticipated rewards? More generally, what explains agency choices of core procedures?

I consider two types of rewards: budget growth and stable source funding of the agency. I try to predict which agencies will improve and which will remain efficient. The predictor variables include indicators of the agency's goals from the first survey, research efforts noted in the first survey, the type of oversight agency, the manager's attendance at a national conference of pretrial release agencies in 1974, budget growth, and changes in funding stability between the two surveys. The two economic variables are the statistically significant predictors. Stable source funding by the second survey is positively associated with the agency's probability of improving effectiveness, and larger positive budget changes are associated with the probability of beginning and remaining efficient.

This analysis supports the conclusion that the behavior of public agencies is influenced by the rewards they expect to receive.

Evolution, Management, Incentives

The statistical analysis bounds understanding of this industry's evolution but, because of the limitations of the data available, cannot explain why individual managers made the choices they did. To supplement this analysis, I have interviewed several directors of pretrial release agencies to get a richer understanding of their behavior.

The statistical analysis reveals that practically all of the progress in the pretrial release industry came from the increased adoption of the call-in requirements; the use of point systems changed little over the time period studied. Furthermore, the manager of a pretrial release unit, if not directly accountable to a judge, judicial council, or chief court administrative officer, was most likely to be accountable to a probation department. Some evidence suggests that the probability of having a call-in requirement is higher under probation department supervision. What explains this?

Are probation department supervisors more alert to the benefits of a call-in requirement? Not according to the two managers I interviewed who are subject to this type of supervision. John Wallace from the New York Office of Probation and Susan Bookman of the Berkeley OR Project both report virtually no interest on the part of higher management from probation in the effectiveness of their units. Wallace, who took over the operation from Vera in the 1960s, explained that his primary concern was one of equity: to make the agency's services available to all New York criminal defendants. His requests for new budgets and the ensuing negotiations always had to do with how rapidly the agency could expand to achieve this equity goal, and nobody ever questioned the agency's effectiveness (which was deteriorating rapidly). Bookman also reports no interest from her probation department in the agency's effectiveness.

These interviews bring to mind the bureaucratic routine hypothesis.[4] That is, what could be more natural to a manager with close ties to a probation department than to have a call-in requirement? It is part of the standard routine of probation. A manager with roots in probation might do this whether it was efficient or inefficient. The increase in efficiency could result in part from the accidental coincidence of bureaucratic routines and what in this case happens to be efficient. This would not explain, however, why the rewards of budget growth and stable funding source are correlated with effectiveness.

Bookman described an ongoing research effort that she makes to inform those important in her external environment (judges, the board of supervisors) of the project's work: interviews conducted, releases, FTA rate. She also described an example of her internal use of the data gathered to improve performance. She found out that Sunday releasees had higher FTA rates than those released on other days and that the project provided no personal contact at the time of release on this day (as opposed to all other days). She responded by assigning a staff person to attend Sunday releases.

Bookman's example suggests that the correlation between rewards and efficiency could arise through indirect, but appropriate, means. "Better" managers—those who always want to improve their agencies' effectiveness, who take the time and effort to seek improvements, and who keep those in their external environment apprised of their efforts and results—may by these actions persuade funders that the agency is in

4. Allison (1971, pp. 67–100).

good hands and thereby increase the chances for securing better rewards. Even though this is indirect—funders do not know the true effectiveness of the agency, let alone what explains it—managerial efforts may pay off in terms of both improved effectiveness and better rewards.

Lessons for Improving Public Service through Innovations and Their Diffusion

Four major lessons can be derived from this analysis. First, the effectiveness of a diffused innovation cannot be assumed. Almost all public services are complex, and even when good judgment is used to identify a successful innovation—perhaps as with the Ford Foundation Program on Innovations in State and Local Government—more is needed to increase the odds of successful diffusion. The details matter. In responding to the demands of differing localities for adaptability, the baby must not be thrown out with the bath water. Effort is needed to make sure that the success is replicated and maintained over time.

Second, the economic tool of production analysis is valuable for helping to ensure this success. Production analysis has the potential for identifying the core choices, the parts of the innovation that are crucial to its success. In the case of the bail reform, the use of point systems and a call-in requirement can greatly increase the effectiveness of a pretrial services unit. Assuming one believes as I do in the value of analyses that examine questions like these, the organizational problem remains of who would call for it. The value is received by the industry as a whole, and no single agency has incentive enough to have one conducted. For most state and local services, appropriate national-level organizations for research and development of each do not exist.

Third, the study suggests that more thought be given to the external environments that determine the incentives operating agencies face. The pretrial release units were located, organizationally, in many different ways. Some evidence is available that those with nonjudicial overseers were more likely to improve, and to be rewarded for improvement, than those with direct judicial oversight. In this case, the more effective environment during the time studied may be so as a result of an accident of fit with the procedures that happened to be effective.

Finally, the study indicates that public managers do have incentives to

improve their agencies' effectiveness. A link exists between effectiveness and the rewards an agency receives. This may seem trivially clear to public managers, but it is not to the general public and it remains to be examined further as a scholarly matter. Most would be surprised to learn that a public sector system had improved its productivity at all, let alone at a rate of 7 percent annually.

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Appendix

This appendix provides a summary of the statistical study underlying chapter 15. A full exposition including expectations of signs and relative magnitudes of variables and more discussion of the results is available from the author.

The Data

The Office of Economic Opportunity (OEO) survey covered 90 agencies; the National Center for State Courts survey, 111. Seventy-six agencies were common to both surveys. In each survey, a number of the agencies did not provide complete information, although the information provided was used whenever possible. The numbers of usable observations to estimate the three-part technology structure were ninety-three for interviews, seventy-two for releases, and seventy-eight for failure-to-appear (FTA) rates. Most of the incomplete information was concentrated in the second survey, but statistical tests found no structural differences between the usable observations of the two surveys. The included cases covered a broad spectrum of agencies with budgets ranging from $4,000 to $756,302 and averaging $104,821 (all in 1972

dollars). For the analysis of changes in agency procedures, between forty-five and fifty observations were usable from the potential set of seventy-six. While the results could be different if information was complete, to my knowledge no bias exists toward or away from any finding of this study.

The Technology Structure

Equations were estimated to explain each agency's number of interviews, releases, and failure-to-appear rates. The data from the two surveys were pooled under the statistical hypothesis of structural homogeneity, a hypothesis maintained as a result of the Chow test results reported in each table.

INTERVIEWS. The number of interviews (I) conducted by an agency is determined primarily by its resource allocation decisions. To the extent it devotes resources to activities other than interviewing, it should conduct fewer interviews. In the analysis, these other activities consist primarily of follow-up procedures (F) and research and development (R). Specific procedures are represented by dummy variables and distinguished by subscripts as described in table A-1 (six follow-up procedures, three types of research and development efforts). For example, $F_{12} = 1$ if an agency uses both a call-in requirement and systematic notification as part of its follow-up procedures, and $F_{12} = 0$ otherwise. Similarly, $R_1 = 1$ if an agency gathers data on the number of defendants excluded from project consideration (reflecting an interest of the agency in expanding its interviewing range), and $R_1 = 0$ otherwise.

In conducting interviews, virtually all agencies have standardized forms. The main procedural variables are whether or not a point system (P) is used to score the responses and to make recommendation decisions. Another factor that should affect the number of interviews completed is the timing (T) of the interview—whether it is conducted before the initial bail hearing, after it, or in some cases at both times (for example, when an agency serves more than one court, each court may have a strong and different preference about timing). The timing choice affects the nature of the population interviewed. For example, the "before" case presumably includes better risk defendants whose responses might be easier to verify. The intensity of verification effort is one variable for which no good measure existed, and its omission

Table A-1. *Definition of Variables*

Variable	*Definition*
A	1 if the agency has authority to release defendants
B	Annual budget of the agency, 1972 dollars[a]
C_1	1 if the agency may recommend defendants be released on condition of cash deposit
C_2	1 if the agency may recommend defendants be released on condition of money bail
E	1 if the agency is in a demonstration or developmental stage
F_1	1 if agency requires released defendants to report or call in regularly
F_2	1 if agency systematically notifies defendants of required court appearances
F_{20}	1 if systematic notification is the only followup procedure utilized by an agency
F_{123}	1 if an agency systematically notifies, requires acknowledgment of the notification, and requires defendants to report or call in regularly
F_{12}	1 if an agency requires defendants to report or call in regularly, and systematically notifies them of required appearances but does not require acknowledgment of the notification
F_{1w}	1 if an agency is not known to belong to categories F_{20}, F_{123}, F_{12}, but may have some followup procedures; these cases form a weak call-in category because most of them are known to utilize at least the call-in procedure
FTA	Failure-to-appear rate of defendants released on agency recommendation
I	Annual number of interviews completed by the agency
L	1 if the agency only serves lower courts (courts of special or limited jurisdiction)
P_1	1 if agency uses a point system when interviewing
P_{11}	1 if agency using a point system does not allow any subjective evaluation
R_1	1 if an agency gathers data on the number of defendants excluded from agency consideration
R_2	1 if an agency does not have tabulated data on the court dispositions of defendants released on their recommendations
R_3	1 if the agency uses a computerized information system
ROR	Number of defendants interviewed who were both recommended for release on their own recognizance and granted it
S	Population of the community served by the project
T_1	1 if the agency interviews defendants only before bail is set by a judicial officer
T_2	1 if the agency interviews defendants only after bail is set by a judicial officer
V	1 if the agency reported the use of volunteer staff
X_1	1 if the agency has two or three exclusion conditions
X_2	1 if the agency has more than three exclusion conditions

a. Budget data from the spring 1975 survey were deflated by 1.19 based on the state and local government price deflators for 1974 and 1972, as reported in *Economic Report of the President*, January 1976, table B-3, p. 175.

may be a source of bias if it is correlated with any of the included variables.

Two other nonresource variables should affect the number of interviews. One is that some agencies can release at least certain types of defendants on their own authority (A). The other is whether or not a project is in its initial experimental stage (E), when one might expect fewer interviews as procedures are being developed and community support sought.

All of the above variables interact with the program's budget (B) to produce interviews. In addition, some projects report the use of volunteers (V) as part of the staff, which should increase interviews, other things being equal. The vector form of the equation estimated is:

$$(1) \quad I = a_0 + a_1 B + a_2 V + a_3[F+R+P+T+A+E]B + \varepsilon$$

Table A-2 reports the estimation results. Column (1) contains ordinary least squares (OLS) results, and column (2) contains generalized least squares (GLS) results after correcting for heteroskedasticity by dividing all observations by the square root of the agency's budget. Column (3) is a simplified GLS specification of the model in columns (1) and (2), with broader distinctions among follow-up procedures and use of point systems by agencies.

The coefficient estimates vary little across the three equations estimated, lending some confidence to the stability of the estimates. The signs of the coefficients are virtually all as expected and their magnitudes plausible. The one exception is the positive coefficient in column (2) on F_{20} (systematic notification only, as compared with no notification), which was expected to be negative. This may result from interaction with the omitted variable for verification efforts because both depend on access to court records and calendars.

The most important findings from this analysis are that call-in procedures are costly in terms of interviews, while the notification procedures do not appear to be. The use of point systems results in more interviews per dollar.

RELEASES. The number of defendants recommended for release on their own recognizance (ROR) and released by the courts depends on the number of interviews conducted, the types of recommendations made, and the degree of judicial cooperation achieved. Judicial cooperation depends on the specific operating procedures used by the agencies. In addition to the procedural variables included in the interview equation,

Table A-2. *Interview Equation*

	(1) OLS		*(2) GLS*		*(3) GLS*	
Independent variable[a]	*coeff*	*|t|*	*coeff*	*|t|*	*coeff*	*|t|*
F_1	-	n.a.	-	n.a.	–.045	(2.43)[b]
F_2	-	n.a.	-	n.a.	.054	(2.00)[b]
F_{20}	.048	(1.92)[c]	.058	(1.67)[c]	-	n.a.
F_{12}	.008	(.32)	.010	(.30)	-	n.a.
F_{12}	–.004	(.11)	–.002	(.04)	-	n.a.
F_{1w}	.003	(.09)	.006	(.14)	-	n.a.
P_1	.050	(2.85)[b]	.022	(.97)	-	n.a.
P_{11}	.024	(1.17)	.024	(.97)	.030	(1.62)
R_1	.003	(.10)	.028	(1.46)	.031	(1.72)[c]
R_2	.073	(5.39)[b]	.059	(2.99)[b]	.055	(2.88)[b]
R_3	–.029	(1.68)[c]	–.026	(1.05)	–.019	(.84)
T_1	–.045	(3.07)[b]	.023	(1.19)	.025	(1.35)
T_2	.088	(2.61)[b]	.071	(2.11)[b]	.073	(2.35)[b]
E	.045	(1.68)[c]	–.030	(1.03)	–.029	(1.06)
A	.075	(2.40)[b]	.054	(1.61)	.056	(1.78)[c]
V	–80.900	(.03)	2571.300	(1.93)[c]	2775.00	(2.17)[b]
B	.055	(2.18)[b]	.007	(.17)	.007	(.17)
$1/\sqrt{B}$	-	n.a.	461.300	(.32)	307.000	(.22)
Constant	–43.700	(.04)	–6.330	(.41)	–3.310	(.23)
n	93		93		93	
R^2	.86		.49		.49	
$\bar{R}^2$	.83		.35		.38	
Chow (d.f.)	-		1.09 (21,51)			-
k	20		21		18	

Note: OLS = ordinary least squares; GLS = generalized least squares; coeff = coefficient; |t| = absolute value of the t-statistic; n.a. = not applicable; $1/\sqrt{B}$ = reciprocal of the square root of B; constant = constant term to be estimated in each equation; n = number of observations; R^2 = the (unadjusted) proportion of variance explained by the estimated equation; $\bar{R}^2$ = proportion of variance explained by the estimated equation, adjusted for the degrees of freedom; Chow (d.f.) = the F-statistic for the Chow test for structural homogeneity, with degrees of freedom in parentheses; and k = number of parameters including the constant term and dummy variables constructed for missing data.

a. Estimates on the missing value variables are not reported here, as they have no meaning.

b. Significant at the .05 level.

c. Significant at the .10 level.

there are variables representing agencies that may recommend cash deposit or money bail (C) as an alternative to ROR, variables to represent agency conditions for excluding (X) certain defendants from consideration, and agencies that only serve lower courts (L). The vector form of the equation estimated is:

$$(2) \quad ROR = b_0 + b_1 I + b_2[F+R+P+T+E+L+X+C]I + \mu$$

The results are reported in table A-3. As with the interview equation, the equation was first estimated by OLS and then reestimated by GLS to correct for heteroskedasticity. The estimated equations, shown in columns (1) and (2), have coefficients with signs generally as expected and magnitudes that are plausible. They are also stable across the equations, and the goodness of fit is relatively high.

Several important findings emerge from these estimations. First, the requirement for regular reporting or calling-in gains significant increases in judicial acceptance of release recommendations. While notification alone has some tendency toward increased releases, adding the call-in requirement substantially increases this (from .06I to .249I, a difference that is statistically significant at the .01 level with $t = 2.43$ using a one-tailed test based on the estimated variance-covariance matrix from the GLS estimation). Second, those agencies using objective point systems have some tendency toward increased releases compared with no point system (.031I, the difference between the two GLS point system coefficients), but the big gain in releases is for those with point systems that allow some subjective judgment (.212I).[1]

A third important finding is that those agencies that include the option of recommending money bail get significantly more RORs per interview. This is consistent with relatively little use of the option and with enhanced judicial beliefs in the appropriateness of the agency's ROR recommendations.

FAILURES TO APPEAR. Explaining measured FTA rates poses a few more estimation difficulties than the prior two parts of the technology structure. One problem is that great variation exists in the definition each agency uses to measure FTAs (for example, some count the number of appearances missed, while others count the number of people who

1. This may result more from politics than from better recommendations. In New York City's pretrial release agency, where no subjective judgments were made, the man accused of being the psychopathic "Son of Sam" murderer was found qualified for ROR. This created great embarrassment for the city, and occasions such as this can lead to judicial mistrust of agency recommendations. However, such judicial reasoning may be substantially erroneous. Employees of pretrial release agencies who conduct interviews should not be expected to be trained psychiatrists, and there is some evidence in the FTA equations that objective point systems lead to better appearance predictions than point systems that allow subjective judgments. It may be preferable to let pretrial release agencies be responsible for recommendations based on routinized information and to continue to leave the courts responsible for handling exceptional circumstances. The accused in this example was not released, and the only real shock would have been to find a judge, defense attorney, and prosecutor who would all agree to such a release

Table A-3. *Release Equation*

	(1) OLS		(2) GLS	
Independent variables[a]	*coeff*	|t|	*coeff*	|t|
F_{20}	.083	(1.46)	.060	(.85)
F_{123}	.001	(.03)	.043	(.66)
F_{12}	.224	(3.30)[b]	.249	(3.02)[b]
F_{1w}	.219	(2.99)[b]	.209	(2.56)[b]
P_1	.321	(8.00)[b]	.212	(4.12)[b]
P_{11}	–.240	(7.30)[b]	–.181	(3.65)[b]
R_1	.064	(1.52)	.002	(.04)
R_2	.034	(.70)	–.047	(.85)
R_3	–.024	(.43)	.043	(.66)
T_1	.126	(2.82)[b]	.084	(1.64)
T_2	–.024	(.40)	.005	(.07)
E	–.162	(2.73)[b]	–.085	(1.36)
X_1	.019	(.37)	.013	(.21)
X_2	–.090	(2.41)[b]	–.097	(1.96)[b]
C_1	–.196	(3.90)[b]	–.183	(3.13)[b]
C_2	.251	(7.52)[b]	.188	(3.81)[b]
L	.092	(1.88)[c]	.068	(1.14)
I	.007	(.07)	.130	(1.24)
$1/\sqrt{I}$	-	n.a.	33.300	(.45)
Constant	–99.208	(1.03)	–2.400	(.54)
n	72		72	
R^2	.98		.81	
$\bar{R}^2$	.97		.72	
Chow (d.f.)	-		.69 (24,24)	
k	23		24	

Note: OLS = ordinary least squares; GLS = generalized least squares; coeff = coefficient; |t| = absolute value of the t-statistic; $1/\sqrt{I}$ = reciprocal of the square root of I; n.a. = not applicable; constant = constant term to be estimated in each equation; n = number of observations; R^2 = the (unadjusted) proportion of variance explained by the estimated equation; $\bar{R}^2$ = proportion of variance explained by the estimated equation, adjusted for the degrees of freedom; Chow (d.f.) = the F-statistic for the Chow test for structural homogeneity, with degrees of freedom in parentheses; and k = number of parameters including the constant term and dummy variables constructed for missing data,

a. Estimates on the missing value variables are not reported here, as they have no meaning.

b. Significant at the .05 level.

c. Significant at the .10 level.

miss appearances). Fortunately, both surveys included detailed questions about the calculation of this rate, and eight multiplicative dummy variables to control for these definitional differences were constructed and used as shown in table A-4.

A second problem in estimating the FTA rate is that it is bounded between zero and one. A functional form that meets this constraint and

Table A-4. *Failure-to-Appear Equation Measurement Variables*

	(1) OLS		*(2) GLS*		*(3) GLS*	
Independent variables[a]	*coeff*	|t|	*coeff*	|t|	*coeff*	|t|
M482	–.325	(1.16)	–.335	(1.21)	–.368	(1.29)
M491	.813	(2.45)[b]	.730	(2.34)[b]	.731	(2.26)[b]
M493	–.034	(.12)	–.016	(.06)	.041	(.15)
M494	.374	(1.07)	.384	(1.12)	.395	(1.12)
M502	.140	(.36)	.078	(.20)	.236	(.56)
M522	.986	(3.14)[b]	.927	(3.04)[b]	.852	(2.68)[b]
M523	.488	(1.49)	.470	(1.47)	.412	(1.25)
M525	.720	(1.92)[c]	.623	(1.76)[c]	.597	(1.64)

Note: OLS = ordinary least squares; coeff = coefficient; |t| = absolute value of the t-statistic; ROR = release on own recognizance; and FTA = failure to appear. Definitions of measurement variables are as follows: M482 = 1 if rate is for all people with required appearances (expected sign: –), with category of all people who obtained release omitted; M491 = 1 if rate is for all people granted ROR by court (expected sign: +); M493 = 1 if rate is for all people recommended by the agency (expected sign: +); M494 = 1 is rate is for all people both recommended and RORd (expected sign: +), with category of all interviewed by agency omitted; M502 = 1 if counted the number of appearances missed (expected sign: +), with category of counted the number of persons who missed appearances omitted; M522 = 1 if counted as FTA only if willful (expected sign: +); M523 = 1 if counted as FTA only if not remedied within _____ days (expected sign: +); and M525 = 1 if counted as FTA only when bench warrants issued (expected sign: +), with category of counted as FTA regardless of reasons or subsequent appearance omitted.

a. Estimates on the missing value variables are not reported here, as they have no meaning.

b. Significant at the .05 level.

c. Significant at the .10 level.

allows for the dummy variables as well as diminishing returns to agency efforts to reduce the rate is:

$$FTA = 1/(1 + e^{c_0 + c_1 Z + c_2 M})$$

where Z is a vector of substantive variables that affect the rate and M is a vector of variables to control for measurment error. This equation can be estimated with OLS through the following transformation:

$$\ln[(1/FTA)-1] = c_0 + c_1 Z + c_2 M$$

The specification of the Z variables is also more problematic than in the prior parts of the technology structure. In particular, the problem of omitted variables is potentially more significant here. The FTA rate is only partially determined by agency choices of procedures; other factors exogenous to the agency influence this rate. One set of exogenous influences might be thought of as characteristics of the community environment, and another set might be the responses of other criminal justice institutions to the environment. No data on these variables were collected

in either survey. For the first set, a variable measuring the population of the jurisdictions served (S) by each agency was constructed. This variable is a crude proxy for the variety of community factors that lead one to expect higher FTA rates in more populated jurisdictions. The second set, however, remains omitted and is a source of potential bias if it is correlated with any of the included variables.

Agency procedural variables for follow-up (F), use of point systems (P), timing of interviews (T), and exclusion conditions (X) are all likely to influence the FTA rate. In addition, the agency's status as experimental (E), service to lower courts (L), budget (B), and efforts at research (R), all might represent important influences on the FTA rates. Thus the equation estimated has the vector form:

$$(3) \quad \ln[(1/FTA)-1] = c_0 + c_1[F+P+R+T+E+A+X+L+S+B] + c_2M + v$$

The results are reported in tables A-4 and A-5. Because the dependent variable is a rate, heteroskedasticity is not a problem here and OLS is used. The three columns in each table represent minor variants in specification, and the coefficients are relatively stable across them. The signs are generally consistent with expectations (in these equations, positive signs are associated with lower FTA rates).

These equations highlight several important findings. First, the use of point systems shows a very strong and significant lowering of the FTA rate. The lower rate is with the objective, not subjective, point system, although the difference is not statistically significant. These results suggest the judicial response to objective point systems (in the release equation) is a substantial overreaction if not an incorrect one.

Second, none of the follow-up procedures achieves statistical significance. Nevertheless, the call-in requirement is associated with a tendency for lower FTA rates, as expected.

Finally, the impact of the budget is significant and as expected. Agencies with more resources given their potential workload have lower FTA rates, other things being equal.

Agency Rewards and Choices

A simple regression analysis was run on the forty-nine agencies with budget data for both surveys and in which the procedures during the time of the first survey were available. The second survey budget (B_2) was

Table A-5. *Failure-to-Appear Equation*

	(1) OLS		(2) GLS		(3) GLS	
Independent variables[a]	*coeff*	|t|	*coeff*	|t|	*coeff*	|t|
F_1	-	n.a.	.201	(.88)	.188	(.73)
F_2	-	n.a.	−.438	(1.54)	−.371	(1.24)
F_{20}	−.502	(1.46)	-	n.a.	-	n.a.
F_{123}	−.185	(.55)	-	n.a.	-	n.a.
F_{12}	.072	(.17)	-	n.a.	-	n.a.
F_{1w}	.069	(.19)	-	n.a.	-	n.a.
P_1	.760	(2.75)[b]	.714	(2.61)[b]	.704	(2.48)[b]
P_{11}	.088	(.30)	.168	(.59)	.192	(.65)
R_1	-	n.a.	-	n.a.	−.016	(.07)
R_2	-	n.a.	-	n.a.	.132	(.49)
R_3	-	n.a.	-	n.a.	−.301	(.88)
T_1	.340	(1.31)	.370	(1.43)	.365	(1.33)
T_2	−.377	(1.06)	−.309	(.91)	−.317	(.90)
E	.535	(1.98)[b]	.595	(2.29)[b]	.561	(2.10)[b]
A	.723	(2.44)[b]	.570	(1.88)[c]	.638	(1.99)[b]
X_1	−.312	(1.09)	−.313	(1.13)	−.405	(1.37)
X_2	.156	(.48)	.222	(.74)	.107	(.33)
L	−.322	(1.12)	−.332	(1.17)	−.378	(1.26)
S/100,000	−.023	(2.57)[b]	−.022	(2.46)[b]	−.023	(2.51)[b]
B/10,000	.031	(3.33)[b]	.029	(3.16)[b]	.028	(3.03)[b]
Constant	1.970	(3.94)[b]	2.080	(4.22)[b]	2.149	(3.86)[b]
n	78		78		78	
R^2	.61		.60		.61	
$\bar{R}^2$	.38		.39		.37	
Chow (d.f.)	-		.78 (27,24)		-	
k	29		27		30	

Note: OLS = ordinary least squares; coeff = coefficient; |t| = absolute value of the t-statistic; n.a. = not applicable; S/100,000 = S divided by 100,000; B/10,000 = B divided by 10,000; constant = constant term to be estimated in each equation; n = number of observations; R^2 = the (unadjusted) proportion of variance explained by the estimated equation; $\bar{R}^2$ = proportion of variance explained by the estimated equation, adjusted for the degrees of freedom; Chow (d.f.) = the F-statistic for the Chow test for structural homogeneity, with degrees of freedom in parentheses; and k = number of parameters including the constant term and dummy variables constructed for missing data.

a. Estimates on the missing value variables are not reported here, as they have no meaning.

b. Significant at the .05 level.

c. Significant at the .10 level.

estimated as a function of the initial budget (B_1) and the presence or absence of each of the two efficient techniques (P_1, F_1); t-statistics are in parentheses.

$$(4a)\quad B_2 = \underset{}{53{,}880} + \underset{(1.35)}{.6211B_1} + \underset{(1.82)^*}{.3738(F_1B_1)} + \underset{(1.07)}{.3590(P_1B_1)} + \underset{(1.00)}{}$$

$$R^2 = .32;\ n = 49$$

While the coefficients on the procedural variables are not statistically significant, they are both positive: Agencies using the efficient techniques do get somewhat better rewards than agencies not using them.

Unfortunately, the data do not permit detailed investigation of why this is so. For example, knowing if the role of formal evaluation of these agencies has been an important factor in explaining the observed rational selection would be informative. However, certain variations in organizational features can be examined. For example, the pretrial release agencies may be controlled by any one of a large number of other public agencies. Some are located in probation departments, some are run by the courts themselves (either by judicial council, chief judge, or court administrator), some are located in noncriminal justice public agencies such as community welfare departments and so on. Given the dynamics of court operations, one of these settings might be better able to encourage greater effectiveness than another. To test this, a regression equation similar to (4a) was specified, with two additional dummy variables to distinguish judicially controlled rewards (J) from all other selection agents:

$$\begin{aligned}(4b)\quad B_2 = {} & 61{,}250 + .1909B_1 + .7640(JB_1) + .6135(F_1B_1) \\ & \quad (1.47) \quad (.40) \quad (1.25) \quad (1.46) \\ & + .6958(P_1B_1) - .5321(JF_1B_1) - .6748(JP_1B_1) \\ & \quad (1.51) \quad (-.59) \quad (-.73) \\ & R^2 = .35;\ n = 49\end{aligned}$$

None of the coefficients in this equation is significant. Nonetheless, note that the positive coefficients on the variables indicating use of efficient procedures are almost completely offset by the negative coefficients on the same variables interacted with judicially controlled rewards. They suggest that judicial encouragement is unrelated to the efficiency of the agencies they control, while for other overseers a positive relation exists between efficiency and reward.

The rewards of overseers are important for two different reasons. First, relative expansion of efficient agencies makes the industry as a whole more productively efficient. Second, these rewards may be related to the decisions of agencies about which procedures to use.

The agency choice of procedures has been hypothesized to be a function of its goals, rewards, search activities, and information. Two logit equations concerning this choice are estimated: one looks at the probability of agency improvement (that is, a switch from some inefficient procedure to an efficient one, provided no deterioration has taken place elsewhere); the other looks at the joint probability of starting efficient and staying efficient.

The firm goals and internal search variables are represented by the three research activities used in the estimation of the technology structure. The use of computer information systems is a search in the wrong direction for the efficient procedures and may be negatively associated with both dependent variables. The interest in interviews, represented by gathering exclusion data, should be positively associated with point systems and negatively associated with the call-in requirement. For that reason, it has been omitted from this specification, which counts either improvement equally. Failure to gather disposition data could indicate a relative interest in interviews or failures to appear. Because both procedures improve the failure-to-appear rate, this variable is interpretable and included as a control.

Agency search is not limited to internal searching; it may also look externally for good procedures to imitate. In June 1974, a national conference on pretrial release and diversion was held in San Francisco, California. The scheduled talks and workshops at the conference did not suggest discussion, pro or con, of either of the procedures identified here as efficient (the primary focus was on legal issues, though the role of evaluation was discussed). However, informal communication during the conference might have some effect. I obtained a list of the attendees, and each agency in the sample with an attending representative was noted (CF).

Two types of rewards to firms are considered: budget rewards, which may be positive (PB) or negative (NB), and stable source funding, which was defined as local funding (single source) by the time of the second survey. For the latter, separate terms were entered to distinguish those agencies that were initially only single source (SS) and those that were initially multiple (MS), as well as those going from single to multiple (SM). (Thus those agencies that used two or more sources in both periods were the omitted category.) Finally, the governing agency was included as either the court (J), private agency (PR), or other public agencies (PU) with probation agencies the omitted variable. The equations are (with asymptotic t's in parentheses):

$$\begin{aligned}(5a)\quad \text{Prob [Improve]} = &-1.3193 - .9516R2 - 2.3289R3 - .1270CF \\ &\quad (-.79) \quad (-.69) \quad (-.79) \quad (-.88) \\ &+ 4.1503SS + 3.7078MS + 2.522SM + .0164PB \\ &\quad (1.88)^* \quad (1.74)^* \quad (1.36) \quad (.13) \\ &+ .0484NB - .8463J - 1.3806PR + .3709PU \\ &\quad (.35) \quad (-.54) \quad (-.61) \quad (.26)\end{aligned}$$

Likelihood ratio statistic = 14.25; n = 37; percentage correctly predicted = 75.68.

(5b) Prob [Always Efficient] = $-3.8693 + .3297R_2 - .0026R_3 + .8058CF$

$$\underset{(1.52)}{} \quad \underset{(.21)}{} \quad \underset{(.00)}{} \quad \underset{(.45)}{}$$
$$-.0031SS + 2.7835MS - .0536SM + .4139PB$$
$$\underset{(.00)}{} \quad \underset{(1.41)}{} \quad \underset{(-.03)}{} \quad \underset{(1.85)*}{}$$
$$+ .295NB - 4.4195J - .3841PR + 1.5887PU$$
$$\underset{(.65)}{} \quad \underset{(-1.11)}{} \quad \underset{(-.17)}{} \quad \underset{(1.00)}{}$$

Likelihood ratio statistic = 40.68; n = 46; percentage correctly predicted = 84.78.

The significant variables in these equations are the economic ones. Stable source funding by the second survey is positively associated with the probability of beginning and remaining efficient. Also as expected, the use of computer information systems has a large negative coefficient in the probability of improvement equation.