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HAS GPRA INCREASED THE AVAILABILITY AND USE OF PERFORMANCE INFORMATION?

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Has GPRA Increased the Availability and Use of Performance Information?

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Abstract

The underlying logic of the Government Performance and Results Act (GPRA) suggests that programs should be evaluated based on empirical evidence that they actually produce the intended outcomes. This study applies the same logic to GPRA itself, investigating empirically whether GPRA may have increased the availability and use of performance information in federal agencies.

Better GPRA performance reporting is correlated with greater availability and use of several kinds of performance information by federal managers in the programs and operations they supervise. The results are statistically significant and relatively large. Correlations are especially significant for types of activities GPRA sought to encourage, such as output and outcome measures and use of performance information to allocate resources, set priorities, and develop measures and goals. These findings are consistent with the theory that GPRA has indeed prompted improvements in the availability and use of performance information in the federal government.

Leadership commitment to achieving results also has a big effect on the availability and use of performance information. Leaders respond to institutional constraints and incentives, but they have leeway to pursue performance management more or less aggressively. Program types have a small effect on the availability and use of performance information; agency ideology has a similarly small effect. A more focused mission has a moderately large and positive effect. Congressional interest in using performance information can spur agencies to develop and use performance measures.

Keywords: GPRA, performance measures, performance management, bureaucracy.

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INTRODUCTION

For the past two decades, federal agencies have faced increased pressure to show results. The Government Performance and Results Act (GPRA) of 1993 directs federal agencies to produce strategic plans with outcome-related objectives, annual performance plans with performance goals, and annual performance reports that measure progress toward those goals. GPRA explicitly requires indicators of "outputs, service levels, and outcomes" (GPRA Sec. 4.B.1115). The legislation also emphasizes service quality, customer satisfaction, and efficiency. It envisions that performance information will improve congressional decision-making and help federal managers improve service delivery.

Some scholars argue that GPRA thus far has mostly affected the use of performance information by agency managers, rather than Congress or the president (Joyce 2007, pp. 31–36; Frederickson and Frederickson 2006, p. 185; Hatry et. al. 2005, p. 200). Research on the state and international levels has also found that agency managers use performance information even though such information has had little effect on legislators' budgeting decisions (Melkers and Willoughby 2007, p. 86; Perrin 2007, p. 163). This study seeks to identify whether GPRA has affected the availability and use of performance information by federal managers, after controlling for other factors that might affect the results.

Data from the Government Accountability Office's periodic surveys of federal managers provide a useful means of assessing how GPRA and other institutional factors affect the availability and use of performance information inside federal agencies (Dull 2009). Every few years since 1997, GAO has surveyed federal managers about

performance management in the 24 agencies covered by the Chief Financial Officers' Act (GAO 2008, 2001). These agencies accounted for 96 percent of federal outlays in fiscal 2007 (McTigue et. al. 2008, p. 11). In 2000 and 2007, GAO surveyed a large enough sample of managers to permit calculation of valid response averages for each agency.[2]

Three groups of GAO survey questions are of interest:

(1) Five questions ask managers whether they have outcome, output, efficiency, quality, or customer satisfaction measures for their programs or projects;

(2) Nine questions ask whether managers use performance information for various purposes in the programs or other activities for which they are responsible (allocating resources, setting priorities, adopting new approaches or changing work processes, coordinating with external organizations, refining performance measures, setting performance goals, setting job expectations, rewarding employees, or managing contracts); and

(3) Several "environmental" questions can be used as control variables in regressions, such as one that asks managers to gauge the strength of agency leadership's commitment to performance management and questions that inquire about congressional or OMB interest.

A cursory glance suggests that GPRA may have had some positive effects on agency performance measurement. Federal managers increasingly report that their agencies have performance measures, including output and outcome measures (Steinhardt

[2] Descriptions of the surveys are available in Steinhardt (2008) and GAO (2001). In some cases, GAO broke out survey results separately for certain components of cabinet departments, such as the Federal Aviation Administration vs. the rest of the Department of Transportation. In these cases I computed a weighted average for the entire department, using the number of managers surveyed in sub-units as weights. Thomas Beall at the Government Accountability Office graciously furnished spreadsheets with agency-specific averages and the totals for each sub-unit.

2008, 4). The Association of Government Accountants evaluates agencies' annual performance and accountability reports, awarding a Certificate of Excellence in Accountability Reporting to exceptional reports. The number of reports receiving this award has risen from two in 1998 (the first year of awards) to five in 2000 and 17 in 2007.[3] In addition, the Mercatus Center's annual *Performance Report Scorecard* shows that the average quality of agencies' annual performance reports improved by 17 percent between 1999 and 2006, in spite of the fact that the evaluators tightened the scoring criteria each year to reflect new best practices[4] (McTigue, Wray, and Ellig 2008, 17).

Yet even these data suggest some caution is in order. While GAO finds an increase in the availability of performance measures, it reports little improvement in the extent to which performance measures are actually used for significant managerial decisions, such as allocating resources, setting priorities, or setting job expectations (Steinhart 2008, 6). What's more, it is not clear whether even the increased availability of performance measures in the GAO surveys is a result of GPRA. The GAO surveys ask federal managers whether they have specific types of performance measures for their programs and operations, and whether they use performance information for various purposes in their programs and operations. When federal managers report that they have performance measures for their programs, such measures may be at a level far removed from, and maybe even unrelated to, the over-arching measures articulated in the agency's GPRA documents. Managers' positive responses may simply indicate that they have continued to develop and use measures suited to their programs, independent of whatever the agency is doing in response to GPRA.

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[3] http://www.agacgfm.org/performance/cear/cearprioryear.aspx.

[4] Scores fell somewhat for 2007, largely due to some agencies' difficulties implementing a new "pilot" format. The average score for 2007 was 11 percent higher than 1999.

One way to explore the general relationship between GPRA and performance measurement is to correlate the quality of an agency's GPRA initiatives with the availability and use of performance information reported by federal managers. The Mercatus *Scorecard* scores provide a ready measure of the quality of agency GPRA initiatives. If managers in agencies with better GPRA initiatives are more likely to report that they have and use the types of performance measures envisioned by GPRA, then we can be more confident that GPRA is responsible for the observed improvement in the availability and use of performance information.

The regression analysis in this paper finds that the quality of an agency's annual GPRA reports has a large and positive effect on all performance measures and most uses of performance information. The regressions also control for various institutional and incentive factors that might affect performance management. Leadership commitment to achieving results has a big effect on the availability and use of performance information. Leaders respond to institutional constraints and incentives, but they have substantial "slack" that allows them to pursue performance management more or less aggressively regardless of the institutions and incentives. Program types, such as block grants or research and development, have a small effect on the availability and use of performance information; agency ideology has a similarly small effect. A more focused mission has a moderately large and positive effect. Congressional interest in using performance information to make program or funding decisions can spur agencies to develop and use performance measures. These results help evaluate several hypotheses advanced in the performance management literature and point the way toward some high-leverage actions decision makers could take to promote performance management.

HYPOTHESES AND KEY VARIABLES

Prior research suggests that the quality of an agency's GPRA efforts could affect the availability and use of performance information in individual programs. Strategic planning, after all, determines what counts as "performance" (Joyce 2007 p. 32). Chun and Rainey (2005) found that agencies whose GPRA goals and measures were more outcome-oriented had higher scores on managerial effectiveness, customer-service orientation, productivity, and work quality in a 2000 survey of federal employees administered by the National Partnership for Reinventing Government. The Bush administration's Program Assessment Rating Tool (PART) sought to apply GPRA principles at the program level, and Manchester and Norcross (2008) found that agencies with higher-quality GPRA reports also achieve higher PART scores. In their survey of state performance management, Melkers and Willoughby (2007, pp. 95–96) report that the existence of a "formalized 'managing for results' process" is associated with greater use of performance information for management purposes by agency staff.

It is also possible that GPRA would have little correlation with the availability or use of performance information in particular programs because GPRA did not go far enough to align the incentives of agents (federal managers and employees) with principals (policy decision-makers or voters). Public-management reforms undertaken in the Westminster countries include performance contracts that hold managers at multiple levels accountable for results. The U.S. civil service system has had nowhere near the type of overhaul experienced in New Zealand; hence, U.S. managers have had less incentive to align performance measurement for their programs with overall organizational goals or measures (Scott et. al. 1997, p. 375; Kettl 1997, p. 454).

Some anecdotal evidence supports the idea that, at least in some agencies, program performance measures and management have not been closely tied to GPRA. Some agency managers say they are simply "doing GPRA" to fulfill a congressional requirement (Radin 2006, p.126) or regard GPRA as merely "one more burden to deal with" (Frederickson and Frederickson 2006, p. 51). An official at the National Institutes of Health noted that GPRA implementation focuses on overall research outcomes, with measurement of individual research programs conducted separately (Frederickson and Frederickson 2006, p.108). Others have voiced concern that GPRA would become no more than a "paperwork and compliance exercise" (Kamensky et. al. 2005, p. 2; Wye 2005, p. 58; Breul 2003, p. 62). This may reflect Moynihan's (2008, pp. 68–70) general point that elected leaders sometimes adopt performance management initiatives because they have "symbolic benefits" even if the information is never used. Thus, GPRA might have a positive effect on the availability and use of performance information, or it might have no effect.

Table 1 summarizes the relevant aspects of GPRA, the GAO surveys, and the Mercatus Center's *Performance Report Scorecard*. The 24 agencies covered by the Chief Financial Officers Act, which are the subject of the GAO surveys and the Mercatus *Scorecard*, accounted for 96 percent of federal outlays in fiscal 2007 (McTigue, Wray, and Ellig 2008, 11).

Table 1: GPRA, the GAO surveys, and the Mercatus *Scorecard*

	Government Performance and Results Act (GPRA)	**Government Accountability Office surveys**	**Mercatus Center Performance Report Scorecard**
Coverage	Applies to virtually all federal agencies	24 federal agencies subject to the Chief Financial Officers' Act	24 federal agencies subject to the Chief Financial Officers' Act
Reporting Period	Requires agencies to produce multi-year strategic plans, annual performance plans, and annual performance reports	Conducted approximately every 3 years Only the 2000 and 2007 surveys were large enough to calculate valid responses for each agency	Conducted annually since fiscal 1999
Scope	Strategic plans must include performance measures Performance measures must include outputs and outcomes Performance plans must include performance goals Performance reports must report on goals and measures	Among other topics, federal managers were asked: (1) Whether they have specific types of performance measures, such as outcome, output, or quality measures (2) Whether they use GPRA strategic goals for various purposes, such as allocating resources or developing measures (3) Whether they use performance information for specific purposes, such as allocating resources or setting employee job expectations	Evaluation of the quality of agencies' annual GPRA performance reports Includes evaluation of: (1) Transparency: How easy is it to find the report, understand the report, and validate the data? (2) Public Benefits: How well does the report explain the outcomes the agency seeks to achieve and demonstrate how the agency has affected those outcomes? (3) Leadership: What evidence demonstrates that the agency's leadership uses performance information to manage the agency?

In addition to the quality of an agency's GPRA initiatives, many institutional factors could affect the availability and use of performance information. Influences noted by previous scholarship include leadership commitment to performance management, agency size, program type, complexity of the agency's missions, ideology, and elected officials' interest in performance management.

Leadership Commitment

Classic works by Tullock (2005) and Downs (1967) posit that individuals in a bureaucracy achieve career advancement by performing their roles to the satisfaction of their superiors. It follows from this that agency managers can be expected to adopt and use performance measures if upper management makes a credible commitment to performance management (Dull 2009, pp. 258–61). Based on its periodic surveys and extensive research on management reform, GAO concluded, "Perhaps the single most important element in successfully implementing organizational change is demonstrated, sustained commitment of top leaders" (Steinhardt 2008, p. 9). Scholars of management reform at the federal, state, and international levels emphasize the importance of agency leadership's commitment for achieving performance-oriented management reforms (Melkers and Willoughby 2007, pp. 74, 94–95; Perrin 2007, pp. 116–117; Ingraham et. al. 2003, p. 131). Using data from 1997 and 2000 GAO surveys, Dull (2009, p. 268) finds a positive correlation between leadership's perceived commitment to performance management and managers' use of performance information.

The GAO surveys explicitly ask managers whether they agree that leadership of the organization demonstrates a strong commitment to achieving results. The percentage of affirmative responses provides a variable that measures leadership commitment.

Agency Size

Agency size could either improve or reduce the availability and use of performance information. Larger organizations can benefit from economies of scale, but they are more difficult to coordinate and manage (Kettl 1988, pp. 2–3). These conflicting influences suggest that the availability and use of performance information might at first increase with agency size, but at some point size becomes a handicap.

Agency outlays (in $2007) provide a measure of agency size. The regressions test for different effects of agency size by including both outlays and outlays squared, to see if size has the same effect in very large agencies that it has in other agencies.

Program Type

Many federal programs require the cooperation of other entities, such as state governments, contractors, grant recipients, private borrowers, or regulated firms (Joyce 2007, pp. 55–57). Utilization of such partners in place of direct federal service provision has been termed "government by proxy" (Kettl 1988), "third-party government" (Posner 2002), or the "hollow state" (Frederickson and Frederickson 2006). States, contractors, or other recipients of federal dollars have their own goals, agendas, and performance measurement systems which may not sync with those of the federal government (Radin 2006. pp. 159–80; Metzenbaum 2005, pp. 285–86; Kettl 1988, p.18). Even mundane

matters like different federal and state fiscal years, quarters, grant periods, and program years create measurement difficulties (Adams 2005, p. 435). Federal officials may also be less likely to use performance information originating from outside parties, because the outside party can filter and distort the information to serve its own purposes (Kettl 1988, p. 16).

"Government by proxy" might imply that agencies which rely on outside parties to a greater extent will be less likely to have and use performance information. Alternatively, different kinds of third-party service delivery might have different effects. Research and development programs, for example, may pose a special challenge, not just because research and development is often performed by outside grant recipients, but also because the long time lag between activity and results can make it harder to attribute specific results to specific research programs (Frederickson and Frederickson 2006, pp. 95–103; Wye 2005, pp. 37; GAO 2004, p.89). Performance measurement for regulatory programs may be more difficult because regulatory agencies often lack data needed to assess results, face many factors outside their control that influence results, and have long time lags between adoption of a regulation and results (GAO 2004, p. 90). Block and formula grants to state and local governments have historically been very difficult to measure and manage due to divergence of interests between different levels of government (Kettl 1988, pp. 49–70; GAO 2004, pp. 90–91). Competitive grants, on the other hand, might pose less of a problem because federal managers can build performance measurement into the contracting process. Credit programs might also be less prone to performance information problems because the government can use well-known and accepted metrics for evaluating loans, such as repayment and default rates.

Government capital acquisition can be guided by quantitative metrics and benefit-cost analysis.

Program data produced by OMB when it conducted PART evaluations can be used to construct variables that control for agencies' mix of program types. OMB classified each program as direct federal provision, credit provision, research and development, block and formula grant, competitive grant, federal capital acquisition, or regulatory. Using OMB's data, I calculate the percentage of each agency's spending on each program type.[5] The percentages for the six program types other than direct federal service provision are used in the regressions to see whether program delivery methods other than direct federal service provision make a difference in the availability or use of performance information.

Mission Complexity

Some federal agencies, such as the Nuclear Regulatory Commission or the Defense Department, have relatively unified missions, with most programs focused on an over-arching common purpose. Others, like the Departments of Health and Human Services or Interior, are more like diversified "holding companies" with a wide variety of programs that serve different missions. Radin (2006, pp. 132–48) describes the difficulties such complexity creates when a department like HHS is expected to create a unified strategic plan and report on outcomes produced by all of the diverse units. In

[5] These percentages are calculated for fiscal 2008 from a spreadsheet produced by the Office of Management and Budget as part of its Program Assessment Rating Tool, available via www.expectmore.gov. Because PART gradually expanded its scope to review most federal programs, the spreadsheet produced in fiscal 2008 contains the most comprehensive list of programs. Since only 2008 and 2009 spending data are available for the complete list of programs, the percentages spent on various types of programs only approximately control for differences across agencies in 2000 and 2007.

contrast, Ingraham et. al. (2003, p.124) note that spinning off the Social Security Administration from HHS allowed Social Security to limit its scope and mission. One might reasonably expect that departments that address a wider variety of missions could be less successful at measuring and using performance information.

One way of measuring an agency's mission complexity is by calculating the Herfindahl-Hirschman Index (HHI) of its spending by budget subfunction. The HHI is a tool used in industrial economics to measure the degree of concentration in a market. It is defined as the sum of the square of the market shares of all firms in the industry. In a market with a single firm that has 100 percent of the market share, the HHI would equal 10,000 (100 x 100). Similarly, a market with an infinite number of small firms with infinitesimal market shares would have an HHI equal to zero. Thus, a high HHI indicates that a few firms serve most of the market, whereas a low HHI indicates that there are a large number of competitors with relatively equal market shares (Carlton and Perloff 1994, p. 344).

In similar fashion, calculating the HHI using an agency's budget subfunctions shows whether most of the agency's spending is concentrated in a few large subfunctions or spread across many. An agency with a high HHI can be considered less complex, with more focus on one or a few major missions. An agency with a low HHI is more complex, with spending and activity spread across a greater number of different missions.

Agency Ideology

The type of performance information considered useful depends in part on one's ideology (Radin 206, pp. 188–90). Conservatives who seek to limit government and

liberals who want to prove that government is working well would naturally want to see performance information that proves their point. Indeed, the desirability of having performance information at all may depend on ideology. The ideological biases of agencies could, therefore, affect whether they produce and use performance information.

Clinton and Lewis (2008) construct a measure of agency ideology based on a combination of expert opinion and objective agency characteristics. These scores are included in the regressions to measure agency ideology. A higher score indicates a more conservative agency. Ideology scores for the agencies in our sample range from 2.21 (Defense) to –1.43 (Labor). It is not obvious whether more liberal agencies should be expected to have and use performance information to a greater extent than more conservative agencies, or vice versa.

Elected Officials' Interest

Seminal theories of bureaucracy posit that agency managers have a strong career interest in satisfying their superiors (Tullock 2005, Downs 1967). Ultimately, this means that the political and career leadership of the agency has an interest in responding to the desires of elected leaders who control appointments, authority, and budgets. In the United States, the separation of powers effectively makes agencies responsible to both the president and Congress (Joyce 2007, pp. 31–51). Conflict between the president and Congress does not just reflect differences in party, ideology, or values, but is inherent in the structure of the U.S. government (Niskanen 1994, p. 227; Radin 2006, pp.188–32; Frederickson and Fredreickson 2006, p. 45).

For this reason, separate variables are needed to measure the effects of congressional and executive-branch interest in agency performance management. Responses to two GAO survey questions provide these variables. GAO asked federal managers to indicate whether certain factors are significant barriers to performance management, including "lack of ongoing congressional commitment or support for using performance information to make program/funding decisions" and "concern that OMB will micromanage programs in my agency." OMB is not, of course, elected, but it is the closest proxy in the survey that might represent presidential interest.

Interpretation of the first variable is fairly straightforward; it shows whether managers think Congress is interested in using performance information to make key decisions. The political realities agencies face are of course more complicated than this simple division between the president and Congress. Agencies must be sensitive to diverse authorizing, appropriations, and government operations committees and subcommittees (Shepsle and Weingast 1995; Frederickson and Frederickson 2006, p. 45; Radin 2006, pp. 127–29). The GAO survey question about congressional interest, however, does not ask managers to specify which part of Congress they are referring to. If it is statistically significant, that suggests more detailed research on the role of individual congressional committees in promoting or discouraging performance management may be fruitful.

Interpretation of the OMB question is more ambiguous. A positive response may indicate that OMB is paying attention to performance management in the agency, but a negative response does not necessarily mean OMB is not paying attention. OMB might be quite interested in agency performance management even if it does not micromanage.

Despite this drawback, this is the best variable we have found that provides some indication of OMB's interest.

"Pay for Performance" Certification

Perhaps the most straightforward incentive affecting performance management may be whether the highest-ranking executives in the agency have their own pay linked to performance. Since 2004, agencies have had the opportunity to increase Senior Executive Service (SES) pay if they demonstrate that their appraisal system links SES pay with organizational performance. The Office of Personnel Management provides annual reports indicating which agencies' performance-based pay systems have received full certification from OPM and OMB (OPM 2007, pp. 30–31). We use full certification as a dummy variable to indicate agencies whose senior executives have stronger personal incentives to develop and use performance information.

ECONOMETRIC MODEL AND RESULTS

Regression Model and Data

In addition to their direct effects on the availability and use of performance information, institutional constraints likely influence leaders' commitment to performance management. To control for this possibility, the econometric model employs a two-stage least squares estimation procedure (Theil 1971, pp. 451–56). Leadership's commitment to performance management is regressed on variables that measure institutional constraints. Responses to various GAO questions about the availability and use of performance management are then regressed on the predicted value of leadership

and on the variables measuring the institutional constraints. Thus, the constraints can affect the availability and use of performance management directly, or indirectly via their effect on leadership's commitment to performance management.

One might imagine that the GPRA variable, like leadership commitment, might be influenced by the institutional constraints managers face, and so a two-stage least squares approach might be appropriate for the GPRA variable as well. Regressing the GPRA score on the other variables, however, reveals none of the explanatory variables has a statistically significant correlation with the GPRA score, and the R-squared of the equation is below 0.10. For this reason, I rejected a two-stage approach using the GPRA score.

Following the practice in numerous GAO reports, this study counts the percent of managers who responded "to a great extent" or "to a very great extent" as an affirmative response. For each GAO question about the availability or use of performance information, I estimate the following pair of equations:

(1) $\text{Leadership} = \alpha + \beta_1\text{Outlays} + \beta_2\text{OutlaySq} + \beta_3\%\text{Credit} + \beta_4\%\text{R\&D} + \beta_5\%\text{BFGrant} + \beta_6\%\text{CompGrant} + \beta_7\%\text{Capital} + \beta_8\%\text{Regulatory} + \beta_9\text{Spending HHI} + \beta_{10}\text{Ideology} + \beta_{11}\text{Congress} + \beta_{12}\text{OMB} + \beta_{13}\text{GPRA Quality} + \beta_{14}\text{Year2007} + \beta_{15}\text{SES Certification} + \varepsilon$

(2) Availability or use of performance information =

$\alpha + \beta_1$Leadership + β_2Outlays + β_3OutlaySq + β_4%Credit + β_5%R&D +

β_6%BFGrant + β_7%CompGrant + β_8%Capital + β_9%Regulatory + β_{10}Spending HHI

+ β_{11}Ideology + β_{12}Congress + β_{13}OMB + β_{14}GPRA Quality + β_{15}Year2007 + ε

In each equation, α is a constant, the β's are coefficients on the explanatory variables, and ε is an error term. Table 2 lists the dependent variables, which measure the availability or use of performance information. Table 3 defines the explanatory variables and lists the predicted sign for each variable's influence on the availability and use of performance information, based on the discussion in the previous section. Leadership is presumed to have a positive effect on both the availability and use of performance information. Variables with a positive effect on Leadership, therefore, would have an (indirect) positive effect on the availability and use of performance information as well. Table 4 shows summary statistics for all variables.

Table 2: Dependent Variables

Variable Name	Variable Definition
Outcome	% of managers who say in GAO surveys that they have outcome measures for their programs or projects
Output	% of managers who say in GAO surveys that they have output measures for their programs or projects
Efficiency	% of managers who say in GAO surveys that they have efficiency measures for their programs or projects
Customer	% of managers who say in GAO surveys that they have customers satisfaction measures for their programs or projects
Quality	% of managers who say in GAO surveys that they have quality measures for their programs or projects
Allocate	% of managers who say in GAO surveys that they use performance information to allocate resources in their programs or projects
Priorities	% of managers who say in GAO surveys that they use performance information to set program priorities in their programs or projects
Change	% of managers who say in GAO surveys that they use performance information to adopt new approaches or change work processes in their programs or projects
Coordinate	% of managers who say in GAO surveys that they use performance information to coordinate their program activities with other internal or external organizations
Measures	% of managers who say in GAO surveys that they use performance information to refine performance measures for their programs or projects
Goals	% of managers who say in GAO surveys that they use performance information to set or revise goals for their programs or projects
Job Exps	% of managers who say in GAO surveys that they use performance information to set job expectations for individuals they manage in their programs or projects
Reward	% of managers who say in GAO surveys that they use performance information to reward the government employees they supervise in their programs or projects
Contracts	% of managers who say in GAO surveys that they use performance information to develop or manage contracts in their programs or projects

Table 3: Definitions and Predicted Signs of Explanatory Variables

Variable Name	Variable Definition	Predicted Sign
Leadership	% of managers who say in GAO survey that their agency's leadership demonstrates strong commitment to achieving results	+
Outlays	Agency outlays, in $2007	+
OutlaySq	Agency outlays squared	–
%Credit	% of agency budget devoted to credit programs	+
%R&D	% of agency budget devoted to research and development programs	–
%BFGrant	% of agency budget devoted to block and formula grant programs	–
%CompGrant	% of agency budget devoted to competitive grant programs	+
%Capital	% of agency budget devoted to capital acquisition programs	+
%Regulatory	% of agency budget devoted to regulatory programs	–
Spending HHI	Herfindahl-Hirschmann Index of agency spending on budget subfunctions	+
Ideology	Agency ideology score developed by Clinton and Lewis (2007)	?
Congress	% of managers who say in GAO survey that lack of congressional commitment or support for using performance information to make program or funding decisions is a factor that hinders the creation or use of performance information	–
OMB	% of managers who say in GAO survey that concern about OMB micromanagement hinders the creation or use of performance information	–
GPRA Quality	Score the agency's GPRA report received on the Mercatus Center's annual *Performance Report Scorecard*	+
Year2007	Dummy variable = 1 in 2007	?
SES Certification	Dummy variable = 1 if the agency's SES performance and compensation appraisal system received full certification from OPM and OMB for linking pay with organizational performance	+

Table 4: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Explanatory Variables					
Leadership	46	63.4783	12.7133	29.8	89.6
Outlays	46	98.78	178.28	0.031	672
Outlays Squared	46	40,851	106,031	0.000961	451,584
% Credit	46	0.045	0.157	0	0.76
% R&D	46	0.094	0.225	0	1
% BF Grant	46	0.163	0.234	0	0.775
% Comp. Grant	46	0.086	0.190	0	0.767
% Capital	46	0.125	0.194	0	0.62
% Regulatory	46	0.067	0.205	0	1
Spending HHI	46	6191	2571	1773	10000
Ideology	46	0.0239	0.9308	–1.43	2.21
Congress	46	23.8	8.7	8.3	46.7
OMB	46	20.0	7.6	3.8	38.1
GPRA Quality	46	33.8	8.3	17.0	55.0
Year 2007	46	0.52	0.51	0	1
SES Certification	46	0.22	0.42	0	1
Dependent Variables – Existence of Performance Measures					
Outcome	46	50.4	10.7	30.1	71.7
Output	46	57.1	10.4	39.6	85.2
Efficiency	46	41.1	10.3	21.1	67.4
Customer	46	40.0	12.2	13.6	74.2
Quality	46	40.4	11.2	23.5	67.5
Dependent Variables – Uses of Performance Information					
Allocate Resources	46	48.7	8.4	30.1	65.9
Set Priorities	46	50.2	10.0	25.9	69.3
Change	46	47.5	10.1	27.0	63.9
Coordinate	46	40.9	9.3	19.8	57.5
Measures	46	41.8	9.4	22.6	60.5
Set Goals	46	47.3	9.5	28.1	66.6
Establish Job Exps	46	49.3	10.8	21.6	69.6
Reward Employees	46	48.7	10.6	23.6	70.9
Manage Contracts	46	26.6	10.7	7.9	54.4

Econometric Results

Table 5 shows the econometric results for the five GAO questions about the availability of performance measures. Tables 6 and 7 show regression results for the nine dependent variables that indicate uses of performance information. (To aid the reader in quickly identifying the effects of each explanatory variable in each table, results for the first stage Leadership equation are repeated in each table.)

The first stage equation predicting Leadership reveals that many of the institutional and incentive factors are highly correlated with leadership commitment to achieving results. The second stage equations show that Leadership is positively correlated with the availability and use of performance information, usually at the 1 percent level of significance. Some of the institutional variables also have a direct effect on the availability or use of performance information. Whether they affect availability or use directly or indirectly via their effect on Leadership, all of the explanatory variables have the expected sign in almost every case when they are statistically significant. Leadership is always significant at the 5 percent level or higher.

The quality of an agency's annual GPRA report is not correlated with Leadership but does have a positive correlation with the availability of performance information. The effect is significant at the 1 percent level for output measures, at the 5 percent level for outcome and customer satisfaction measures, and at the 10 percent level for efficiency and quality measures. The quality of an agency's GPRA report has a positive effect on most, but not all, uses of performance information. These results suggest that GPRA has been more than a mere compliance exercise. Agencies' work on defining and measuring

high-level GPRA goals has filtered down to enhance the availability of performance information at lower levels.

When the Outlay variables are statistically significant, the negative coefficient on Outlays Squared means that at some point the positive effect diminishes with agency size. Setting the first derivative of the regression equation with respect to Outlays equal to zero identifies the point where the effect of Outlays is at a maximum. That figure is approximately $600 billion for efficiency, $900 billion for customer satisfaction, and $550 billion for quality. The only agencies with outlays that exceed some of these figures are Defense ($550.3 billion), Social Security ($621.7 billion), and HHS ($672 billion), all in 2007. Thus, they are the only agencies that experience some diseconomies of scale for production of efficiency and quality measures.

Table 5: Availability of performance information (2 stage least squares models)

Variable	Leadership	Outcome	Output	Efficiency	Customer	Quality
	1st stage	2nd stage	2nd stage	2nd stage	2nd stage	2nd stage
Leadership		.55 [4.38]***	.53 [4.92]***	.47 [4.09]***	.33 [2.27]**	.39 [2.63]**
Outlays	.04 [1.25]	.049 [1.23]	.003 [.10]	.06 [1.57]	.09 [2.04]**	.11 [2.33]**
Outlays Squared	-.000072 [-1.34]	-.000071 [-1.12]	.000007 [.13]	-.0001 [-1.70]*	-.0001 [-2.06]**	-.0002 [-2.35]**
% Credit	14.42 [1.78]*	12.71 [1.32]	29.1 [3.49]***	3.19 [.36]	.93 [.08]	-1.17 [-.10]
% R&D	4.68 [.75]	3.05 [.42]	-14.2 [-2.28]**	-10.29 [-1.53]	-3.73 [-.45]	9.63 [1.14]
%BF Grant	-20.58 [-3.09]***	-9.24 [-1.20]	-9.12 [-1.37]	-10.9 [-1.52]	-19.85 [-2.23]**	-13.6 [-1.49]
% Comp. Grant	-10.23 [-1.44]	12.58 [1.58]	5.83 [.85]	-7.79 [-1.05]	-.62 [.07]	8.38 [.89]
% Capital	2.22 [0.31]	20.35 [2.50]**	6.25 [.89]	18.75 [2.47]**	23.23 [2.48]**	17.82 [1.86]*
% Regulatory	6.82 [0.94]	-2.57 [-.30]	14.27 [1.95]*	-5.31 [-.67]	-14.65 [-1.51]	-2.85 [-.29]
Spending HHI	.0014 [2.45]**	-.00008 [-0.12]	.0009 [1.55]	.0005 [.71]	.0006 [.77]	-.0003 [-.38]
Ideology	-4.82 [-2.81]***	-2.57 [-1.33]	-2.39 [-1.43]	-2.89 [-1.60]	-1.68 [-.76]	-.43 [-.19]
Congress	-.35 [-2.08]**	-.15 [-.80]	.07 [.44]	.08 [.45]	-.19 [-.87]	-.14 [-.62]
OMB	-.0018 [-.01]	.12 [.61]	.17 [.96]	-.28 [-1.46]	.09 [.37]	.15 [.62]
GPRA Quality	-.12 [-.78]	.40 [2.40]**	.40 [2.77]***	.30 [1.91]*	.48 [2.50]**	.39 [1.99]*
Year 2007	14.49 [4.79]***	-1.76 [-.54]	-3.98 [-1.42]	3.04 [1.01]	1.32 [.35]	-.46 [-.12]
SES Certification	1.17 [0.33]					
Adj. R-squared	.71	.46	.57	.50	.45	.32
F-statistic	8.27***	10.86***	8.27***	8.87***	6.93***	6.35***

T-statistics in parentheses.
Statistical significance levels:
*10 percent **5 percent ***1 percent

Table 6: Uses of performance information (2 stage least squares models)

Variable	Leadership	Allocate	Priorities	Change	Coordinate
	1st stage	2nd stage	2nd stage	2nd stage	2nd stage
Leadership		.65 [5.81]***	.47 [3.86]***	.56 [4.61]***	.34 [3.33]***
Outlays	.04 [1.25]	.03 [.85]	.02 [.63]	.04 [.97]	.05 [1.38]
Outlays Squared	-.000072 [-1.34]	-.00004 [-.75]	-.00004 [-.67]	-.00007 [-1.11]	-.00008 [-1.49]
% Credit	14.42 [1.78]*	8.37 [.97]	21.8 [2.34]**	24.1 [2.57]**	22.7 [2.84]***
% R&D	4.68 [.75]	-1.69 [-.26]	-21.7 [-3.12]***	-13.9 [-2.00]*	-10.1 [-1.69]
%BF Grant	-20.58 [-3.09]***	-1.25 [-.18]	-10.7 [-1.44]	-15.5 [-2.07]**	-14.4 [-2.25]**
% Comp. Grant	-10.23 [-1.44]	13.5 [1.90]*	-2.52 [-.33]	5.19 [.67]	11.69 [1.77]*
% Capital	2.22 [0.31]	13.8 [1.90]*	10.9 [1.39]	7.3 [.93]	10.6 [1.57]
% Regulatory	6.82 [0.94]	-7.12 [-.94]	.16 [.02]	-7.62 [-.93]	2.31 [.33]
Spending HHI	.0014 [2.45]**	-.0002 [-.34]	.001 [1.54]	.0004 [.6]	.0007 [1.17]
Ideology	-4.82 [-2.81]***	-.90 [-.52]	-3.65 [-1.96]*	-3.23 [-1.72]*	-2.56 [-1.60]
Congress	-.35 [-2.08]**	-.04 [-.26]	.13 [.70]	.03 [.14]	-.05 [-.33]
OMB	-.0018 [-.01]	-.13 [-.73]	.04 [.18]	.08 [.38]	.04 [.26]
GPRA Quality	-.12 [-.78]	.65 [2.40]**	.35 [2.16]**	.56 [4.61]***	.34 [2.50]**
Year 2007	14.49 [4.79]***	-5.97 [-2.06]**	-.29 [-.09]	-.30 [-.09]	4.21 [1.56]
SES Certification	1.17 [0.33]				
Adj. R-squared	.71	.30	.42	.43	.51
F-statistic	8.27***	13.55***	7.87***	7.69***	8.16***

T-statistics in parentheses.
Statistical significance levels:
*10 percent **5 percent ***1 percent

Table 7: Uses of performance information (2 stage least squares models)

Variable	Leadership	Measures	Goals	Job Exps	Reward	Contracts
	1st stage	2nd stage	2nd stage	2nd stage	2nd stage	2nd stage
Leadership		.41 [3.51]***	.44 [3.96]***	.53 [4.52]***	.60 [4.20]***	.30 [2.71]**
Outlays	.04 [1.25]	.01 [.39]	.04 [1.06]	.008 [.23]	.01 [.30]	-.009 [-.26]
Outlays Squared	-.00007 [-1.34]	-.00003 [-.43]	-.00006 [-1.00]	-.00002 [-.34]	-.00003 [-.36]	.00003 [.45]
% Credit	14.4 [1.78]*	20.1 [2.21]**	20.9 [2.45]**	18.22 [2.01]**	13.50 [1.22]	8.79 [1.02]
% R&D	4.67 [.75]	-8.48 [-1.25]	-4.91 [-.77]	-17.9 [-2.65]**	-16.17 [-1.96]*	2.69 [.42]
%BF Grant	-20.6 [-3.09]***	-9.57 [-1.32]	-8.22 [-1.20]	-8.62 [-1.19]	-6.79 [-.77]	.91 [.13]
% Comp. Grant	-10.23 [-1.44]	11.29 [1.50]	7.25 [1.03]	-3.09 [-.41]	-3.41 [-.37]	26.18 [3.67]***
% Capital	2.22 [.31]	19.52 [2.54]**	19.41 [2.69]**	13.52 [1.77]*	15.55 [1.67]	28.42 [3.90]***
% Regulatory	6.82 [.94]	4.95 [.62]	7.71 [1.03]	-2.27 [-.29]	-4.83 [-.50]	8.43 [1.11]
Spending HHI	.0014 [2.45]**	.0001 [.17]	.00002 [.03]	.0003 [.43]	-.0002 [-.20]	-.0001 [-.21]
Ideology	-4.82 [-2.81]***	-3.39 [-1.86]*	-3.09 [-1.80]*	-1.80 [-.99]	-.15 [-.07]	-.09 [-.26]
Congress	-.35 [-2.08]**	-.03 [-.19]	-.09 [-.55]	.27 [1.53]	.12 [.56]	-.37 [-2.23]**
OMB	-.002 [-.01]	.16 [.83]	.33 [1.83]*	-.02 [-.09]	.02 [.08]	.50 [2.70]**
GPRA Quality	-.12 [-.78]	.31 [1.99]*	.34 [2.32]**	.18 [1.17]	.27 [1.39]	.04 [.28]
Year 2007	14.49*** [4.79]	-1.18 [-.39]	-1.51 [-.52]	5.32 [1.75]*	-.38 [-.10]	-2.79 [-.96]
SES Certification	1.17 [.33]					
Adj. R-squared	.71	.38	.46	.53	.28	.57
F-statistic	8.27***	6.95***	9.49***	8.94***	6.57***	9.26***

T-statistics in parentheses.
Statistical significance levels:
*10 percent **5 percent ***1 percent

The six program structure variables are sometimes significant and sometimes not. The %Credit variable has a positive, marginally significant effect on Leadership. Hence, indirectly it has a positive effect on the availability and use of performance information.

In addition, %Credit has a direct, positive effect on the availability of output measures and on five uses of performance information. A higher percentage of the agency budget devoted to research and development appears to have a negative effect on the availability of output measures and on four variables indicating uses of performance information.

Block and formula grants have a negative and highly significant effect on Leadership, and hence an indirect negative effect on all performance measures. They have an additional direct, negative effect on Customer Satisfaction, Change, and Coordinate. The percent of an agency's budget devoted to competitive grants appears to have no effect on the availability of performance measures. A higher competitive grant percentage does make use of performance information more likely for allocating resources, coordinating efforts, and managing contracts.

The %Capital variable has a positive, statistically significant effect on the availability of most measures. A higher percentage of the budget devoted to capital acquisition is associated with greater use of performance information to allocate resources, develop or refine measures, set goals, establish employee job expectations, and manage contracts.

The %Regulatory variable has a positive, marginally significant effect only on the availability of output measures. This contradicts our prediction, but perhaps it demonstrates that regulatory agencies find their work-product—regulations—easy to measure.

The positive coefficient on Spending HHI in the Leadership equation suggests that agencies with less-complex missions have management perceived as more

committed to achieving results. Thus, a more-focused mission has an indirect positive effect on the availability and use of performance measures.

Ideology has a negative correlation with Leadership, significant at the 1 percent level. This indicates that more conservative agencies have leaders who are perceived as less committed to achieving results, and this then has an indirect effect on the availability and use of all types of performance measures. Ideology also has a weakly negative effect on four uses of performance information. We offered no prediction on this variable's sign at the outset; the negative relationship between conservative ideology and performance management deserves further research.

Lack of congressional interest in using results information diminishes the availability and use of performance information by diminishing agency leadership's commitment to achieving results. In addition, lack of congressional interest has an independent, negative effect on the use of performance information to manage contracts.

The OMB variable, in contrast, appears to have no effect at all on the availability of performance information or on most uses of performance information. In Table 7, the OMB variable shows a pair of puzzling results. Concern about OMB micromanagement is positively correlated with use of performance information to set goals and manage contracts. Perhaps these are rational defensive responses to fear of OMB micromanagement.

The Year 2007 dummy variable has a highly significant effect on Leadership, indicating an upward exogenous shift in leadership commitment to achieving results between 2000 and 2007. It has a separate, negative effect on Allocate, but the net effect on Allocate, including the indirect effect via Leadership, is still positive. Year 2007 also

has a marginally significant direct positive effect on the use of performance information to set job expectations.

Oddly, the SES Certification variable has no effect on Leadership. This may have occurred because performance-based pay systems for the senior executive service were adopted starting in 2004. This dummy variable equaled 1 only for some agencies in 2007, and the other agencies' systems were all provisionally certified in that year. The year 2007 dummy may be picking up the effects of SES performance-based pay plans, among other factors. Another variable that might measure financial incentives, the percentage of SES achieving the highest performance rating level, was also tried with similarly poor results.

Quantitative Significance

Statistical significance is not quantitative significance (McCloskey and Ziliak 1996). Tables 8 and 9 assess the quantitative significance of the explanatory variables by calculating the effect of each one at its mean value. For the availability and use variables, these calculations include direct effects plus indirect effects from the variables that influence Leadership in the first stage equation. Results are calculated only when the explanatory variable is statistically significant.

As GAO and numerous scholars suggest, leadership has a very large effect on the availability and use of performance information. Leadership's effect, evaluated at its mean value, always exceeds one-half of the mean value of the dependent variable—usually by a large margin.

To some extent, leadership commitment seems to be a response to institutional constraints and incentives. SpendingHHI and Congress have an appreciable effect on Leadership. Agency ideology and the percent of the budget devoted to block grants have a comparatively smaller, but noticeable, effect. Finally, the percent of the agency budget devoted to credit programs has a very small effect.

However, a great deal of the variation in Leadership is unexplained by these factors. The R-squared reported in Table 5 implies that 29 percent of the variation in Leadership is not explained by the variables in the equation. In addition, the Year2007 dummy has an effect almost as large as SpendingHHI or Congress. Some exogenous change or changes between 2000 and 2007 increased agency leadership's commitment to achieving results. It may have been the closer link between SES pay and organizational performance, the Bush administration's Program Assessment Rating Tool, elements of the President's Management Agenda, a learning curve effect, or some other factor. This exogenous shift plus the size of the unexplained variation suggests that agency leaders have substantial discretion to engage in performance management, independent of the incentives and constraints we have identified.

Table 8: Effects of Explanatory Variables on Availability of Performance Information

(Calculated at independent variable mean values)

	Leadership	Outcome	Output	Efficiency	Customer	Quality
Leadership		34.91	33.64	29.83	20.95	24.76
Outlays				4.95	7.91	8.91
% Credit	0.65	0.36	1.66	0.31	0.22	0.25
% R&D			-1.33			
% Block Grant	-3.35	-1.84	-1.78	-1.57	-4.34	-1.31
% Comp Grant						
% Capital		2.54		2.34	2.90	2.23
% Regulatory			0.96			
SpendingHHI	8.67	4.77	4.59	4.07	2.86	3.38
Ideology	-3.48	-1.92	-1.85	-1.64	-1.15	-1.36
Congress	-8.34	-4.59	-4.42	-3.92	-2.75	-3.25
OMB						
GPRA		13.52	13.52	10.14	16.23	13.18
Year2007	7.56	4.16	4.01	3.55	2.49	2.95
SES certification						
Mean of Dep Var	63.48	50.39	57.10	41.11	40.01	40.40

*Calculation uses mean absolute value of Ideology variable because some values are negative, leading to a mean value near zero.

After Leadership, the quality of an agency's GPRA report has the next-biggest effect, usually equal to at least one-fourth of the mean values of the dependent variables. Table 8 calculates the net effect of Outlays and Outlays Squared. While not nearly as large as the effect of Leadership or GPRA, outlays have a larger effect on availability of efficiency, customer satisfaction, and quality measures than any variables besides Leadership and GPRA.

Spending HHI and the Year 2007 dummy have roughly the same size positive effects. Lack of congressional interest has the same size effect as those two variables, but the effect is negative. The one exception occurs for use of performance information to

Table 9: Effects of explanatory variables on uses of performance information (Calculated at independent variable mean values)

	Allocate	Priorities	Change	Coordinate	Measures	Goals	Job Exps	Reward	Contracts
Leadership	41.26	29.83	35.55	21.58	26.03	27.93	33.64	38.09	19.04
Outlays									
% Credit	0.42	1.29	1.45	1.25	1.18	1.23	1.17	0.39	0.20
% R&D		-2.03	-1.30				-1.68	-1.52	
% Block Grant	-2.18	-1.57	-4.40	-3.48	-1.37	-1.47	-1.78	-2.01	-1.00
% Comp Grant	1.16			1.00					2.24
% Capital	1.72				2.44	2.42	1.69		
% Regulatory									1.91
SpendingHHI	5.63	4.07	4.85	2.95	3.55	3.81	4.59	5.20	2.60
Ideology*	-2.27	-4.28	-4.29	-1.18	-3.88	-3.77	-1.85	-2.09	-1.05
Congress	-5.42	-3.92	-4.67	-2.84	-3.42	-3.67	-4.42	-5.00	-11.32
OMB						36.54			9.98
GPRA	21.97	11.83	18.93	11.49	10.48	11.49			
Year2007	1.80	3.55	4.23	2.57	3.10	3.33	6.78	4.54	2.27
Mean of Dep Var	48.73	50.16	47.54	40.91	41.85	47.25	49.28	48.68	26.61

*Calculation uses mean absolute value of ideology variable

manage contracts, where lack of congressional interest has a negative effect that is more than half the size of Leadership's positive effect!

Finally, most of the program type variables and ideology, while often statistically significant, have small effects. One exception would be %BlockGrant, which has a relatively large negative effect on the availability of customer satisfaction measures and use of performance information to change programs or coordinate program efforts. Similarly, ideology has a moderately large negative effect on the use of performance information to set priorities, make program changes, and establish or revise measures and goals.

CONCLUSIONS AND IMPLICATIONS

The foregoing analysis aids in evaluating numerous hypotheses advanced in the performance management literature. Principal findings include:

GPRA has substantially increased the availability and use of performance information. In every equation where it was statistically significant, the quality of an agency's GPRA report is the second-largest factor affecting the availability and use of performance information. The GPRA variable affects every type of performance measure and all but three uses of performance information. The uses it affects reflect factors actually mentioned in GPRA; the three uses it does not affect are not prominently mentioned in GPRA.

Leadership makes a big difference. Top management's perceived commitment to achieving results has a large and statistically significant effect on the availability of all five types of performance measures and all nine uses.

Leaders do more than react. Several institutional constraints and incentives have a moderate effect on leadership commitment. But 29 percent of the variation in Leadership is unexplained by the first stage regression equation, and the year dummy indicates a large exogenous increase in leadership commitment between 2000 and 2007. These findings suggest that leaders do not just passively respond to constraints and incentives, but may also exercise substantial initiative and creativity in promoting the development and use of performance measures.

Agency size matters only occasionally. Agency size, measured by outlays, is correlated only with the availability of efficiency, customer satisfaction, and quality measures. For those three measures, outlays have a positive effect for all but the three

very largest agencies, suggesting that there are some economies of scale in the creation of these measures. But outlays are not correlated with outcome measures, output measures, or any uses of performance information.

Program type matters modestly. Variables measuring the percent of budget devoted to credit programs, block and formula grants, and capital acquisition are often correlated with the availability or use of performance information. The percent of budget devoted to research and development is sometimes correlated with availability or use of performance information, and the percent devoted to competitive grants or regulation is occasionally correlated. The quantitative effects are not large, except for the negative effect of block and formula grants on some types of performance measures and uses of performance information. These results validate the concerns of scholars who argue that performance measurement and management is an easier task for some types of agencies than for others. But the generally small size of these effects suggests one should take care not to overstate their importance.

Complexity and focus matter. Agencies with most of their spending focused on a small number of budget subfunctions have higher percentages of managers reporting that they have and use performance information. This effect is statistically significant for all types of measures and uses of information, and it is larger than the effects of program type.

Congress matters. Lack of congressional interest reduces the availability and use of performance information. This effect is moderately large—about the same as the effect of complexity. It is extremely large for use of performance information to manage contracts. These results suggest that Congress could drive significant improvements in

the availability and use of performance information by actually using the information. They also suggest that congressional attention to contract management can have a very large effect on the use of performance information to manage contracts.

Ideology matters, but the effect is small. For some reason, more conservative agencies are less likely to have and use performance measures. This presents an interesting research puzzle. The effect, however, is not large—about the same as the effects of some of the program type variables.

For proponents of performance management, these results highlight several key levers for promoting performance management in federal agencies. Leadership commitment matters most, and leaders have discretion to encourage the creation and use of performance measures. Congress could advance performance management in agencies by showing more interest in performance. Streamlining individual agencies to provide greater focus on fewer missions could make performance management easier. And discretionary effort pays off: Almost two decades of effort to produce organization-wide GPRA plans and reports has apparently improved the availability and use of performance information in specific programs.

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