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Jamie Giles
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**Do Municipal Stat Programs Improve Services and Reallocate Resources?
Evidence from LouieStat**

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Martin School of Public Policy and Administration
April 23rd, 2014

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Executive Summary

Performance metrics and municipal stat programs are becoming increasingly popular to measure performance of city departments in order to improve services and save taxpayers' dollars. The intent of this research is to give decision makers a better understanding to what extent municipal stat programs make an impact on the departments being measured, using an analysis of Metro Louisville's LouieStat as evidence. Understanding the effect of PerformanceStat tools will provide insight for the Louisville Administration and for other cities considering using a similar tool.

The literature finds performance management tools to be more widely used as a management tool to influence decisions making, rather than as a budgetary tool to impact allocated budget dollars. However, even in the management context, the literature is inconclusive as to whether the tool affects services. Recent literature highlights a few anecdotal examples where performance measurements tools positively impacted the budgetary process.

The analysis presented in this capstone looked at one of the metrics, unscheduled overtime dollars, because data was consistent and available across all departments. Holding all else equal, LouieStat has had an average statistically significant impact on unscheduled overtime dollars of -\$12,710 per agency per month. In aggregate, this equals around a \$2.3 million decrease for unscheduled overtime for those agencies that have implemented LouieStat at the time of this study. Going forward this equals around \$2.7 million dollar decrease per year. The impact of LouieStat was immediate on this metric.

One of the uses of LouieStat was to examine entrenched programs and evaluate if resources could be reallocated to more effective programs. The research found the number of months of LouieStat data the administration could consider did have a marginal statistically significant negative impact on budgetary allocation. In other words, it does appear LouieStat is having a impact on the efforts to "budget for outcomes."

The analysis presented looked at one of the metrics, unscheduled overtime dollars, because data was consistent and available across all departments. In order to understand the complete impact of LouieStat, this research recommends further research needs to be conducted on the correlation between the reduction in overtime and the services of each department. The savings may be overestimated if the reductions are correlated with a decrease in services.

In conclusion, applying internal focus and external pressure to track, manage, and set goals though LouieStat has resulted in improved performance for one metric and marginal effort to budget for outcomes. However, more efforts during the allocation process will be needed to increase the impact of LouieStat on the budget. All else equal, PerformanceStat programs are a worthwhile endeavor for other cities to implement.

Introduction

In January 2012 Louisville Metro Government launched “LouieStat,” a performance management and improvement program of tracking consistent metrics and analyzing key performance indicators to help the central administration understand the key services among eighteen disparate departments. The departments meet with the Mayor and his entire senior leadership team to go through the numbers and address key problems every six to twelve weeks (Beyond Transparency). According to the LouieStat website, the program will help “make data-driven decisions regarding where and how to best allocate resources, and evaluate the true impact and effectiveness of the work being done across Metro Government (About LouieStat).”

Performance metrics and municipal stat programs, like LouieStat, are implemented to improve services and save taxpayers’ dollars. The Office of Performance Improvement (OPI), which manages LouieStat, started with the mantra “What gets measured gets improved (Beyond Transparency).” The intent of this capstone is to give decision makers a better understanding to what extent measurement programs make an impact on the departments being measured, using LouieStat as evidence. First, this research will measure to what extent municipal stat programs have an effect on the Key Performance Indicator (KPI) being measured, and second to what extent LouieStat has had an impact on allocated budget dollars by department. This research will assist the Louisville administration to better understand the impact of the \$300,000 that is spent annually since the implementation of LouieStat. Additionally, understanding the effect of LouieStat will provide evidence to other cities considering using a similar performance stat tool.

Background and Relevant Facts

In 1994, the idea for municipal stat systems began when the New York Police Department created CompStat, which proved effective in fighting crime. Only five years later, a survey found that a third of police departments with 100 or more officers had implemented a

version of the CompStat model; soon other New York agencies such as Parks and Recreation, Human Resources, and Corrections adapted the approach. In 2000, the City of Baltimore implemented a CitiStat system across the entire municipal government. Since then, City Stat programs have been adopted by Atlanta (ATLStat), San Francisco (SFStat), federal government agencies (BorderStat), small governments such as Palm Bay's PalmStat, and international governments (Behn, 2008).

Robert Behn, who focuses his research on PerformanceStat systems, describes them as an “ongoing series of regular, frequent, periodic, integrated meetings during which the chief executive and/or the principal members of the chief executive’s leadership team plus the individual director (and the top managers) of different sub-units use data to analyze the unit’s past performance, to follow-upon previous decisions and commitments to improve performance, to establish its next performance objectives, and to examine the effectiveness of its overall performance strategies (Behn, 2008).”

In Louisville this translates to the heads of each of the City’s eighteen departments¹, who meet with the mayor and his leadership team to analyze performance metrics against the department’s history, goals, and benchmarks every six to twelve weeks. Further, The Office of Performance Improvement (OPI) was created to manage LouieStat. Currently, OPI has five full-time employees (Theresa Reno-Weber, Interview) and cost \$300,000 annually. Since January 2012, departments have implemented LouieStat at different times. Start dates for each department are given in Appendix A.

Metrics

¹ LouieStat also measures the Parking Authority (PARC), a separate partner agency.

There are two categories of measures in LouieStat, enterprise goals and agency goals. Enterprise goals are the same measures across the eighteen city departments. These can be found in Table 1. In January 2012, as Louisville was dealing with a structural deficit problem, an internal report revealed that unscheduled overtime totaled nearly \$14 million dollars, and more than one in five employees increase their base pay by at least fifteen percent- some employees nearly doubling their salaries. Mayor Fischer, knowing Baltimore CitiStat program proved successful in cutting unscheduled overtime by \$30 million, implemented metrics to control abusive overtime practices. The tracking of staff input was intended as a tool that shows just how much overtime is being paid out by each department (Beyond Transparency).

Table 1
Enterprise Goals: Goals Consistent Among Every Department

Dollars Spent on Unscheduled Overtime
Unscheduled Overtime Hours Paid
Hours Lost Due to Work Related Illness and Injury
Employees w/ High Sick Leave Consumption
Hours Not Worked

In addition to enterprise goals, each department has agency goals. These vary by department and measure Key Performance Indicators (KPI) tailored to the unique services of each department. To measure performance the OPI team focuses on three key areas: planning (what is the city government doing today and what does it want to do tomorrow?), performance management (how well are we doing it?), and continuous improvement (how do we do the work and how can we do it better?). Currently, the department measures focus mostly on outputs and a few outcomes. For example, the Louisville Metro Police Department tracks the *number of violent and property crimes; hours spent on special events; and collisions caused by officers*. Parks and Recreation measures the *number of people at community centers, the number of volunteers, and*

*revenue*². Metrics and benchmarks at the department level are still being set by the OPI team. Depending on the type of data the agency is collecting, the output may be reported daily, weekly, or monthly. A full list of agency goals can be found in Appendix B. Table 2 highlights the total number of goals set and measured as of February 23, 2014 using data taken from the online tracking system.

Table 2
Agency Goals as of February 23, 2014

Total Agency Goals	61	Total Agency Goals Set	40
Agency Goals Set	40	Agency Meets Goal	18
Agency Goals Not Scored	8	Agency Approaching Goal	6
Agency Goals Not Set	13	Agency Off Goal	16

After meetings, updated metrics are posted online. These online tracking systems also highlight whether a particular department has a goal(s), and if so, whether it did, did not, or is approaching the goal. These progress benchmarks are represented with a color-coded scale, which resembles a stop light. This data is published online for the public. As of March 23, 2014, the five most-viewed departments had 55,115 views (About LouieStat).

Literature Review

Stat Programs

Robert Behn argues there are several critical factors that improve the utilization of PerformanceStat programs. For this research Behn, studied a small subset of cases where local governments have instituted PerformanceStat programs. He examined their formal descriptions, questioned key executives about their approach, and personally observed many in action. Through the qualitative study he identified the factors that affect the implementations of a

² As of February 23, 2014. Found on LouieStat website.

successful stat program. First, to achieve real results requires active, personal leadership. The leadership cannot delegate responsibility for conducting the meeting or negotiating the performance targets. Secondly, the leadership must adapt the strategy that fits its specific purpose and circumstance –one size doesn't fit all. For example, the research indicated that even another police department cannot use NYPD CompStat. Thirdly, the program must require “real data and analysis. It is not a reoccurring meeting in which agency department head recount their latest triumphs.” Performance data requires analysis, but analysis is “not an outside analyst who gives orders.” Rather the central administration clarifies for everyone what improved results need to be produced and next focuses middle-level managers and front-line workers on achieving specific results. (Behn, 2008)

Performance Measurements Systems

It should be emphasized that, Stat Programs *are not* a new concept. For a number of years, local governments have been urged to measure performance for greater accountability and improvement. In 1994, the Government Performance and Results Act mandated state and local governments experiment with “managing for results” in an effort to regain the confidence of citizens (OEI). Today local governments measure performance --even if it is not in a technologically advanced way-- but studies differ on whether performance measures result in changes. Patria de Lancer Julnes and Marc Holzer (2001) research concluded many state and local government do not use performance measures and only a subset of local governments actually use the performance measures in policy making decisions. The sample studied was drawn from a stratified random sample that was mailed a short Likert-scale survey on the usage of performance metrics. The survey collected the demographics of the government, such as size and type of government (City manager, city council) to control for other factors affecting

adoption and implementation. Using a multiple-regression analysis, the study found internal requirements, internal interest group, and resources had the greatest impact on the adopting a performance measurement program, while resources and information had the greatest impact on actual use of collected performance measures to make decisions. Finally, the findings suggest that 1) identifying and involving internal and external interest groups and employee unions, 2) supporting the adoption of performance metrics even if the metric cannot be implemented, and 3) emphasizing the need to develop performance metrics will help public administrators utilize them more effectively.

David Ammons and William Rivenbark examined the characteristics and patterns of performance measurements use among 15 cities participating in the North Carolina Benchmarking Project. The authors surveyed and interviewed officials regarding their experience using project data to alter performance, to reduce cost, or improve service quality. In conclusion, they found those cities “perceiving accountability most narrowly are less likely to venture beyond workload measures and are unlikely to incorporate performance measures into key management systems.” Those cities that collected higher order measures, such as efficiency, rather than workload or output measures, were more willing to incorporate the measures into decisions. (Ammond and Rivenbark, 2008).

Management vs. Budget Tool

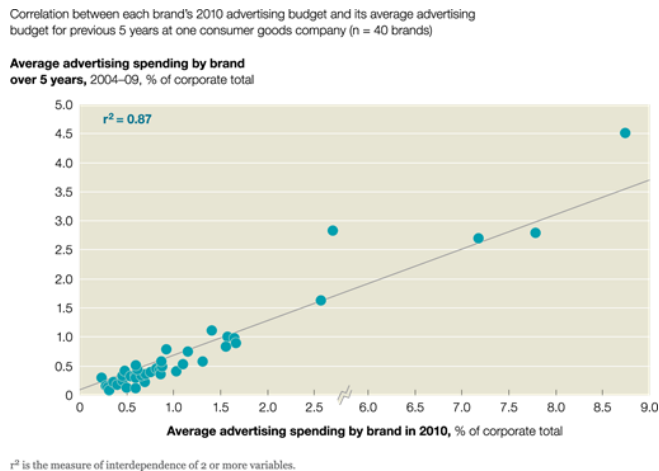
Philip G. Joyce believes that performance measurement has had its greatest success as a management, rather than a budgeting, tool (Joyce, 2003). Hard evidence documenting the performance measurements as a tool for budgetary decision making is rare. Hou, Lunsford, Sides, and Jones wrote in 2011, most of the states in a eleven-state sample study did not use performance measures as useful budgetary tool. Their research identified many states were

hindered by the politics of the budgeting process and a common constraint for administration is to decide how poor performance affects budgetary allocation for the next year. For example, in the state of Utah, despite the fact that the Utah Department of Human Services had lower performance than a few years ago, the governor favored increasing the budget for the entire department. “The governor’s argument is that the department’s work is essential, especially in hard economic times. Therefore, the department needs more resources, not a budget penalty, in order to meet the increased demands that the economic downturn has created.” (Hou, Lunsford, Sides, and Jones, 2011)

Literature indicates that the previous year’s budget is the largest indicator of future allocated budget dollars. According to research, budgets are almost never reviewed in their entirety. During the budgeting process, participants have an overwhelming amount of information, and instead this year’s budget is based on last year’s budget with emphasis on a narrow range of increases or decreases. (Davis, Dempster and Wildavsky, 1966)

Research in the private sector had similar results. Hall, Lovallo, and Musters, published an article for McKinsey Consulting in November 2013 titled *How to Put Your Money Where Your Strategy Is* which finds most companies allocate the same resources to the same business units year after year. The article reviewed 1,600 US Companies and found one-third of the businesses in the sample received almost exactly the same amount of capital in the year prior. Additionally, this article uses budgets allocation to product lines in one department over five years. Looking only at budget allocation and no other factors, the articles concludes the R-squared of .87 makes it difficult to realize strategic goals and undermines performance because there is not much fluctuation in resources based on performance (Figure 1). (Hall, Lovall o, and Musters, 2013)

Figure 1
Correlation between Each Brand's Current Budget
And Average Budget for the Previous Five Years



Positive Results

Some recent research provides brief, yet positive, evidence that PerformanceStat programs are influencing resource allocation. John M. Kamensky, who examined Maryland's Governor Delivery Unit, found the stat program is beginning to influence the budget "in part because stat meetings create a common understanding among key players regarding the operational functionality of the agencies and programs...When budget meetings are held, the staff don't have to give key decision makers a '101' tutorial about the program and what the metrics mean." (Kamensky, 2009)

In the same year, additional research on the Maryland StateStat found a future area of focus for the program is performance informed budgeting that better aligns inputs, activities, outputs with targets, policies, and impact (Dorotinsky and Watkins, 2009). Hou, Lunsford, Sides, and Jones found Maryland was one of the only successful states in using performance measures as a budgeting decision aid through the data-based tool StateStat in conjunction with managing for results. (Hou, Lunsford, Sides, and Jones ,2011)

In *Governing Magazine*, Liz Farmer wrote that, in contrast to other cities, Baltimore has increased its savings while lowering the property tax rate, although other factors besides performance-informed budgeting (e.g., such as the size of the city, long-term planning, and few administration changes) also affected the budgetary process. Baltimore's outcome-based budget, established in 2011, is built around six outcomes: better schools, safer streets, stronger neighborhoods, a growing economy, innovative government, and a cleaner and healthier city. Baltimore's budget prioritizes spending around these goals and their subcategories (Liz Farmer, 2013). Finally Brett Goldstein and Lauren Dyson recently edited and published *Beyond Transparency*, which offers several case studies for cities using open data and civic innovation to move beyond transparency to data-driven decisions. (Goldstein and Dyson, 2013)

In summary, the literature finds performance management tools to be more widely used as a management tool to influence decisions making rather than as a budgetary tool to impact allocated budget dollars. However, even as a management tool, the literature is inconclusive as to whether the tool makes a difference in services. Literature indicates that the previous year's budget is the largest indicator of future allocated budget dollars. For those governments that use performance based budgeting a common constraint for public administrators is decide if poor performance should be allocated more or less funds. Recent literature indicates there are a few antidotal examples of positive results of performance measurements tools affecting the budget.

Research Design

This quantitative study examines to what extent municipal stat programs have an effect on the KPI being measured and allocated budget dollars by department. The units of analysis will be the LouieStat measured departments within the Louisville Metro Government. This includes the eighteen departments and the Louisville Metro Parking Authority.

Because consistent data across every department over time is available for enterprise measures and because agency metrics are still being set by the Office of Performance Improvement team, this research will examine an enterprise goal.³

In order to measure improvement on taxpayer's dollars for the second question, the amount of dollars allocated by department will be examined. One of the uses of LouieStat was to examine entrenched programs and evaluate if resources could be reallocated to more effective programs. High-level department budget allocations are used because enterprise KPIs are given to the entire department and there is not enough consistent data for agency level metrics.

Data Collection

This research contains data provided by the Office of Performance Improvement on enterprise measures every month from January 2011 to October 2013 (34 months) for 19 departments, for a total of 646 observations. A list of start dates were provided by OPI and can be found in Appendix A.

For the second research question, budget information for each LouieStat measured department's FY2009-FY2014 were found on the Louisville Office of Management and Budget website and the online published Comprehensive Annual Financial Reports (CAFRs). FY2009 data was used only to measure percent change for FY2010. For this question 18 departments were measured.⁴ There were 90 total observations.

Allocated budget data, rather than actual budget data, was used to measure the impact of LouieStat as a tool to reallocate resources in the budget process. The Louisville Metro Government is currently in the process of designing a type of "budgeting for outcomes" process that should align the city's spending with its priorities (Beyond Transparency). Using allocated

³ More information about agency measures are discussed in the future studies section of this capstone

⁴ The Parking Authority was excluded because it is a separate agency that does not receive funds through the budgeting process.

budget dollars will identify if during the budget process, the administration is considering performance metrics to reallocate resources. Actual budget data is discussed in the future studies section of this capstone⁵.

Start dates and forum dates were provided by OPI and can be found in Appendix A. During fiscal year 2008, a reorganization of departments was implemented by the Metro Government which is why I start in FY2009. It should be noted that some departments were renamed during this five-year period, and the activities have been reclassified to conform to the FY13 year presentation.

Question 1: Variables

Literature indicated these programs are more affective as a management tool. According to theory, internal monitoring and external pressure on the departments improves what is being measured. In order to measure improvement of performance, my dependent variable will be the unscheduled overtime dollars per month, per department. Of the enterprise goals, overtime dollars was the largest concern because of the findings in internal report on abusive overtime practices. The other enterprise metrics were considered drivers of unscheduled overtime.

I will measure both whether a department had LouieStat, and if so, for how long. Based on my intuition and the literature, I believe LouieStat will have a negative impact on unscheduled overtime dollars, and I would assume the longer an agency has LouieStat, the more effective it would be at accounting for unscheduled overtime. I expect this relationship because the department must justify these numbers to the administration, and the department would become better at managing unscheduled overtime over time.

⁵ I also analyzed the percent change in allocated budget as my dependent variable and found no statistical significance.

The explanatory variables are explained in the chart below with a hypothesized relationship. Since unscheduled overtime is highly seasonal, I will control for seasonality in my model. In order to do this, I will create a dummy variable for each month. Additionally I will also control for unmeasured characteristics of each department with dummy variables for each department.⁶ The time variable controls for any other factor that may be happening over time. For example, the administration's focus on abusive overtime may impact other department's behavior, even if they had not implemented LouieStat.

Table 3
Explanatory Variables

Variables	Reason	Measurement	Hypothesized Relationship
Have LouieStat	Find impact of the programs	0(No LouieStat) 1(LouieStat)	Negative
Number of Months had LouieStat	Find impact for how long have the programs	1-22	Negative
Time	Control for time trend	1-34	Negative
Department	Controls for characteristics of agency	Dummy variable for each department	Varies
Time	Control for seasonality	1-12(Jan=1, February=2)	Varies

Summary Statistics

The summary statistics in table 4 indicate that unscheduled overtime dollar varied widely from -\$5,000 to over \$500,000 per month and averaged around \$60,000 per agency per month. The negative unscheduled overtime dollars can be explained as the amount of money the agency had to reimburse to the general service fund for using too much unscheduled overtime in previous months. Nineteen observations are missing from unscheduled overtime dollars, mostly from the Parking Authority, which is a separate agency. I am not concerned about these missing observations, notwithstanding all of Parking Authorities measures; there was no impact on the

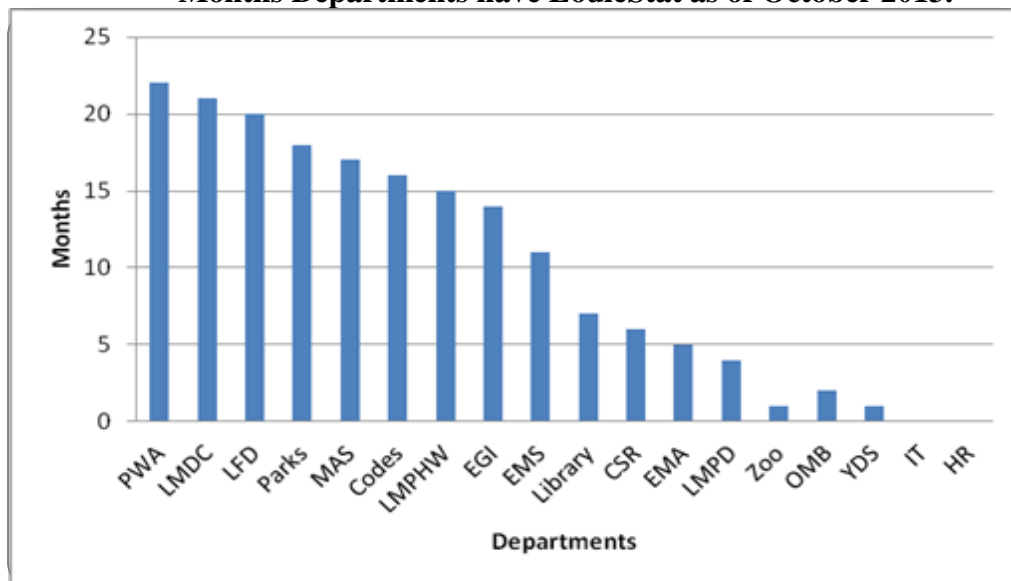
⁶ January (Month 1) will serve as my base month. The Parking Authority will serve as my base department.

coefficients in my linear regression. Additionally, when I used another department as my base department, the impact on the coefficients of LouieStat did not change. Months were coded one to twelve. Of the 646 observations, 181 (28%) were months in which an agency had LouieStat. A bar chart in Figure 2 depicts how many months each department has had Louie Stat. This data corresponds to start dates depicted Appendix A.

Table 4
Question 1: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Unscheduled Overtime Dollars	627	\$60,984	91746.94	-\$5,000.59	\$510,149.1
Had Louiestat	646	0.280	0.44944	0	1
Louiestat age in months	646	2.384	4.82802	0	22
Time	646	17	9.95824	1	34
Department	646	0.053	0.22347	0	1
Months of the Year	646	6.206	3.32611	1	12

Figure 2
Months Departments have LouieStat as of October 2013.



Statistical Model

I used a statistical analysis technique called multiple regression of panel data with fixed effects. Data was organized into multi-dimensional panel, 19 agencies over 34 months. Since each department is non-random and non-independent, I used a fixed effect model, which isolates time independent constant difference between agencies and months, to net out unobserved characteristics of each department and month. All variation between departments which inherently influences unscheduled overtime dollars, such as size of the department, are now controlled for using a fixed effects model. I added a time trend variable to control for any changes over the 34 months unrelated to having LouieStat. Using this model, I also have less concern for omitted variable bias. The Fixed –Effects regression model I used is as follows:

$$\text{Unscheduled overtime Dollars} = \beta_0 + \beta_1 * (\text{Have LouieStat}) + \beta_2 * (\text{Number of Months have LouieStat}) + \beta_3 * (\text{Time Trend}) + \beta_4 * (\text{Months of Year}) + \beta_5 * (\text{Department})$$

Findings

The analysis found LouieStat reduced unscheduled overtime dollars that would have been spent if LouieStat had not been implemented. Holding all else equal, this model found that, on average, LouieStat has a statistically significant impact on unscheduled overtime dollars of negative \$12,720 per agency per month. In other words, for the 181 months LouieStat has been implemented in this study the aggregate decrease has been \$2,302,320. Going forward, now that 18 departments have implemented LouieStat, the total decrease all else equal will be on average \$2,747,520 per year. This model did not find *time* or *the length of time a department has had LouieStat* to have a statistically significant impact. *Seasonality* had a significant impact on unscheduled overtime dollars. Appendix C depicts the average overtime dollars per month relative to January. *Departments* impact on unscheduled overtime dollars holding all else equal are organized by greatest impact to least impact in Table 5.

Table 5
Question 1: Regression Statistics

Overtime Dollars	Coefficient	Std. Err.	t-statistic	P-Value
Louiestat	-\$12,710	5629.708	-2.26	0.024**
LouieStat Age	251	518.2486	0.48	0.629
Time	75	212.3218	0.35	0.724
Month				
February	-12,819	6654	-1.93	0.054*
March	-359	6659	-0.05	0.957
April	13,180	6668	1.98	0.049**
May	29,818	6679	4.46	<.001***
June	11,161	6694	1.67	0.096*
July	24,364	6682	3.65	<.001***
August	22,514	6702	3.36	0.001***
September	15,410	6727	2.29	0.022**
October	18,840	6781	2.78	0.006***
November	21,844	7453	2.93	0.004***
December	-113	7467	-0.02	0.988
Agency				
Police	\$259,497	11031	23.52	<.001***
Emergency Services	216,158	11247	19.22	<.001***
Fire	193,167	11810	16.36	<.001***
Parks Works and Assets	184,325	12011	15.35	<.001***
Corrections	134,392	11906	11.29	<.001***
Emergency Management	65,032	11054	5.88	<.001***
Youth Detention Services	59,900	10976	5.46	<.001***
Parks and Recreation	23,079	11642	1.98	0.048**
Zoo	14,452	11570	1.25	0.212
Animal Services	14,226	10976	1.3	0.195
Codes and Regulations	10,917	11503	0.95	0.343
Public Health and Wellness	9,744	11503	0.85	0.397
Library	8,758	11108	0.79	0.431
Economic Growth and Innovation	6,123	11387	0.54	0.591
Community Services and Revitalization	3,693	11080	0.33	0.739
Technology	2,633	10964	0.24	0.81
Office of Management and Budget	2,518	10992	0.23	0.819
Human Resources	1,905	10964	0.17	0.862

Source: Compiled by author using output from STATA, data from OPI
Significance: ***p<.01; **p<.05; *p<.1; n=627; R-squared=.8554

Question 2: Variables

There is scarce literature on how PerformanceStat programs are influencing the budget making process. According to theory, dollars will be decreased or increased for those activities that do not provide results. In order to measure improvement on tax payer's dollars, my dependent variable will be the dollars allocated by department. Based on my intuition and the literature, I believe the previous year's budget will have the greatest impact on the allocated budget dollars. However, based on the findings in question one, I believe having LouieStat will have a marginal negative impact on the dollars allocated, controlling for variables that may predict changes in budgetary allocations. Additionally, I believe LouieStat will have an impact because the initial metrics have placed heavy emphasis on cost saving goals in personnel.

There are several explanatory variables that could affect budgetary allocations from the previous year. These are explained in the chart below with a hypothesized relationship. The *number of months the department has LouieStat* was counted as the number of months before the fiscal year was concluded, so to measure the number of months' worth of data the administration and council would have to consider before finalizing the budget⁷. I included an *administration* variable, because I wanted to control for the two mayors who have been in office over the study period. Finally, I coded the *departments* 1-18 and the *year* 1-5 to net out characteristics unique to each department and year.

⁷ The number of months before the budget process will be smaller than the numbers reflected in the Figure 1.

Table 6
Question 2: Explanatory Variables

Variables	Reason	Measurement	Hypothesized Relationship
Have LouieStat	Impact of the program	0(No LouieStat) 1(Louiestat)	Negative
Number of Months had LouieStat	Find impact for how long have the programs	1-34	Negative
Personnel Cost	Controls for changes in personnel and size of agency	Percentage	Positive
Contractual Cost	Control for differences in contract services across departments	Percentage	Positive
Supplies Cost	Control for differences in operating cost across departments	Percentage	Positive
Change in Administration Department	2 Mayors in merged government Controls for characteristics of agency	0(Abramson) 1(Fisher) 1-18	Negative Varies
Year	Control for changes in year	1-5	Positive

Summary Statistics

Summary statistics for each of the eighteen departments over five fiscal years are listed in table. The allocated budget dollars per department vastly differ from \$3 million (Animal Services) to \$159 million (Police). The average percent change from the current budget and the previous year's budget is 1.5% or around \$2.8 million.

Table 7
Question 2: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Months with LouieStat before Fiscal Year	90	6.88	6.89	0	18
Percent Change	90	1.5%	0.027	-3%	7%
Difference	90	\$289,227	994,233	-\$2,613,600	\$2,270,700
Allocated Dollars	90	\$35,005,496	\$3,7100,000	\$3,378,760	\$159,000,000
Percent Personnel	90	62.4%	0.2000947	22%	92%
Percent Contractual	90	21.8%	0.1523498	3%	56%
Percent Supplies	90	4.77%	0.0521937	0%	16%

Source: Data compiled by author, original data from Louisville Metro OMB, Louisville OPI

Statistical Model

For the same reason mentioned above, I used a statistical analysis technique called multiple regression of panel data with fixed effects. Data was organized into multi-dimensional panel, eighteen agencies over five years. The Fixed- Effects regression model I used is as follows:

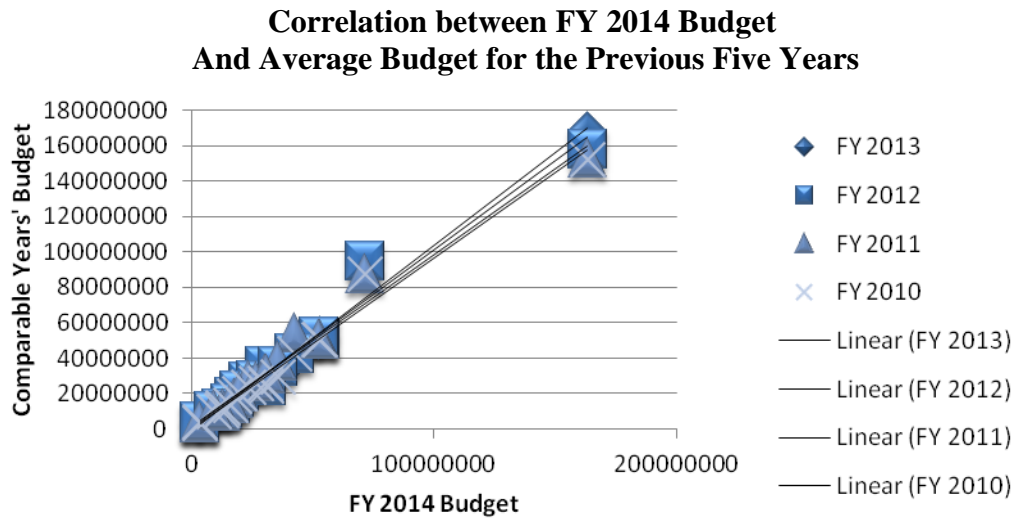
$$\begin{aligned} \text{Total Amount Budgeted} = & \beta_0 + \beta_1 * (\text{Have LouieStat}) + \beta_2 * (\text{Personnel Cost}) \\ & + \beta_3 * (\text{Contractual Cost}) + \beta_4 * (\text{Supply Cost}) + \beta_5 * (\text{Administration Type}) + \\ & \beta_6 * (\text{Year}) + \beta_7 * (\text{Department}) \end{aligned}$$

After running this regression, I also ran a regression using each of the subcategories of the budget as my dependent variable to find out if LouieStat effects show up in these subcategories. I found no statistical significance in any of the subcategories. Additionally, I had *number of forums* and *number of months a department had LouieStat*. However, these two variables had a variance inflation score of 32 which lead me to conclude the two variables were highly correlated. I dropped *the number of forums* from this model.

Findings

The literature concluded the biggest indicator of the amount budgeted is the amount budgeted in the previous years. Figure 3 depicts the correlation between the FY 2014 budget and the previous four years' budget by department. The average R-squared is .98, similar to the Mckinsey consulting article and graph mentioned in the literature review, which found private sector spending over five years results in an R-squared of .87 compared to the base year.

Figure 3



On average the number of months a department had LouieStat, controlling for other factors, had statistically significant impact of $-\$339,490$ per agency. In other words, the more months' worth of data the administration has to consider when creating the budget, the larger the decrease in that agencies allocated budget. The administration type and year did not have a statistically significant impact, while the three sub categories of the budget did have a statistically significant effect. The R-squared for this regression was .96 which means 96% of the variance in the amount budgeted can be explained by the variables below.

**Table 8
Question 2: Regression Statistics**

Allocated Budget	Coefficient	Std. Err.	t-statistic	P-Value
Have Louiestat	-\$590,314	1025369	-0.58	0.567
Number of Months	-\$339,490	79354.94	-4.28	<.001***
Personnel	1.318	0.234519	5.62	<.001***
Contractual Services	0.712	0.143484	4.96	<.001***
Supplies	0.291	0.088303	3.3	0.002
Administration	-816,694	1082620	-0.75	0.453
Year	913,790	586306.6	1.56	0.124

Source: Data compiled by author, Louisville Metro OMB, Louisville OPI
Significance: ***p<.01; **p<.05; *p<.1; n=90; R-squared=.96

The effort to use LouieStat to budget for outcomes in order to consider if resources for entrenched programs can be reallocated does appear to have an impact on total allocated budget dollars by department controlling for other factors. The minimal impact is consistent with literature that finds the previous year's budget is the largest indicator of future allocated budget dollars, however the findings that indicate LouieStat is making an impact on the budget are very promising and noteworthy.

Limitations

For the first question the analysis looked at one of the metrics, unscheduled overtime dollars, because data was consistent and available across all departments. In order to understand the complete impact of LouieStat, this research recommends further research be conducted on the correlation between the reduction in overtime and the services of each department. The savings may be overestimated if the reductions are correlated with a decrease in services. For example, has an effort to reduce unscheduled overtime negatively affected services such as *hospital turnaround times* or *home fire inspections*? Both are examples of agency metrics currently off goal as listed in Appendix B. Additionally, the impact of LouieStat may be overestimated if the program created an incentive to focus on measured goals at the expense of unmeasured goals.

For the second question, high-level department budget allocations are used because KPIs are given to the entire department and there is not enough consistent data for activity level metrics. Once LouieStat has more data on activity level metrics, activity level budgets could be an area for future research. There is a concern that departments may shift money from one program to another within the department. Since such shifts would not be reflected in the overall budget, the impact of LouieStat on the budget may be underestimated.

Additionally, the findings of the negative impact of LouieStat may be overestimated if the agencies that implemented LouieStat first are those agencies that were identified to have entrenched programs the agency wanted to evaluate.

For both questions, one variable that I cannot capture in the model is the political pressure. The literature emphasized many budgetary allocation are political. For example, overtime is political as it is advocated for by the unionized employees. I tried to control this with using the dummy variable for the two administrations, Abramson and Fischer, who although are of the same political party may have different priorities, but this political pressure on the budget is not fully captured.

Conclusion and Recommendations

This research is intended to help both the Louisville administration and other cities, understand how PerformanceStat tools can be used in decision making and resource allocation. The findings of this research indicate LouieStat is minimally effective as a budget tool. The minimal impact, however, is very promising considering the difficulty in previous research for PerformanceStat tools to be used as a budgetary tool.

Recommendation 1: *More effort during the allocation process will be needed to increase the impact of LouieStat on the budget process.*

The first analysis found that LouieStat significantly reduced unscheduled overtime dollars that would have been spent if LouieStat had not been implemented. In other words, although the average unscheduled overtime dollars per month are relatively the same over time, unscheduled overtime dollars would have been about \$2.3 million dollars larger so far, all else equal, if LouieStat had not been implemented.

Recommendation 2: *Averages are not the most accurate way to understand the impact of LouieStat. Analyst should consider using a fixed effects model controlling for other factors to analyze the impact of LouieStat.*

LouieStat has over 60 agency level metrics and four other enterprise metrics that were not examined in the study. LouieStat offers a rich opportunity for various future studies.

Recommendation 3: *To understand the true impact of LouieStat on metrics further research needs to be conducted on the correlation between overtime dollars and services.*

This research concludes that PerformanceStat programs that apply pressure from bi-monthly meetings significantly impact the metric controlling for other factors. For \$300,000 annually, LouieStat offers on average around \$330,000 deduction per agency in allocated budget dollars and \$2.7 million dollars deduction in unscheduled overtime cost.

Recommendation 4: *A Program like LouieStat is a worthwhile effort for similar cities with similar issues to consider. However, implementation and focus by the administration should be modeled to see similar results.*

Area for Future Study

As mentioned above, this research focused on allocated budget data to measure how LouieStat impacts the budget process. Studies could be conducted using actual budget data or full-time employee count as the dependent variable to capture an impact of LouieStat on the monetary resources and personnel resources throughout the year.

Another potential area for future research would be to conduct a qualitative study that can capture benefits in the budgeting process that *cannot* be seen in the quantitative analysis. John M. Kamensky's study concluded Stat programs have led to some changes in the budget because key decision makers have a better understanding of the department and the metrics. I expect because the mayor and his leadership team have met with each agency on average eight time throughout the year discussing performance, the administration has a better understanding going into the budgeting process of which agency are performing and creating valuable outcomes for the community.

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**Appendix A:
LouieStat Implementation Date by Agency**

Department	First Forum Date
Public Works and Assets	January 27, 2012
Corrections	February 27, 2012
Fire	March 29, 2012
Parks	May 21, 2012
Animal Services	June 26, 2012
Codes	July 12, 2012
Public Health and Wellness	July 31, 2012
Economic Growth and Innovation	September 11, 2012
Emergency Services	December 19, 2012
Library	April 10, 2013
Comm. Services & Revitalization	May 15, 2013
Emergency Management	June 19, 2013
Police	July 17, 2013
Zoo	October 9, 2013
OMB	September 18, 2013
Youth Detention Services	October 16, 2013
IT	November 13, 2014
HR	December 13, 2014

**Appendix B:
List of Department KPI and Goal Level
As of February,23 2013**

Activity	Agency KPI	Status on 2/23/13
Codes & Regulations	Open Property Maintenance Cases	Goal Not Set
	Boarding and Cleaning Requests Received	Non scored
	Boarding and Cleaning Cases Resolved	Meets Goal
	Boarding and Cleaning Monthly Backlog	Meets Goal
Community Services & Revitalization	Development Funds Not Expended Within 24 Months	Approaching Goal
	Emergency Home Repairs Requiring Over 30 Days to Complete	Off Goal
	External Monitoring Visits with Findings	Off Goal
	Foreclosures Initiated	Meets Goal
	Metro Demolitions	Meets Goal
	Property Acquisition	Goal Not Set
	Property Disposition	Goal Not Set
Economic Growth & Innovation	NetPromoter Score	Goal Not Set
	Active New Clients	Off Goal
	Jobs Created by GLI	Off Goal
	Annual Salary for New Jobs Created by GLI	Meets Goal
	Jobs Created from Closed METCO Loans	Meets Goal
	Amount of Closed METCO Loans	Off Goal
Emergency Medical Services	Hospital Turnaround Times	Off Goal
	return of spontaneous circulation	Goal Not Set
	dispatched Runs	Non scored
Emergency Management	LMPD Priority 1 Calls - Pickup to Dispatch	Off Goal
	LFD High Priority Calls - Pickup to Dispatch	Off Goal
	EMS Echo Level Calls - Pickup to Dispatch	Off Goal
	911 Calls Not Answered within 15 Seconds	Meets Goal
Louisville Fire	Property Damage	Meets Goal
	Fire Incidents	Non scored
	Fire Runs	Non scored
	Building/Business Inspections	Goal Not Set
	Civilian Fire Injuries	Approaching Goal
	Home Fire Inspections	Off Goal
	Conviction Rate	Meets Goal
	Case Clearance Rate	Meets Goal
Louisville Free Public Library	eBook Circulation	Approaching Goal
	edge Initiative Implementation	Approaching Goal
	Literacy Program attendance	Meets Goal

Louisville Metro Police	Part 1 Violent Crimes	Meets Goal
	Part 1 Property Crimes	Approaching Goal
Louisville Zoo	School Group Attendance	Goal Not Set
	Revenue	Off Goal
	Attendance	Meets Goal
Metro Animal Services	Calls Not Responded in 7 Days	Meets Goal
	Licenses Issued	Goal Not Set
	Intake	Non scored
	Transfers/Fosters	Goal Not Set
	Return to Owner/Return to Field/Spay-Neuter-Release	Goal Not Set
	Adoptions	Goal Not Set
	Live Release Rate	Meets Goal
Metro Corrections	Average Daily Population	Non scored
	Inmate Grievances	Off Goal
	Inmates Requiring Detox Care	Non scored
	Repeat Offenders Requiring Detox Care	Non scored
Metro Tech	Service Availability	Off Goal
	Service Desk Call Abandonment	Meets Goal
	Help Desk Satisfaction	Meets Goal
Office of Mgmt & Budget	Invoices Not Paid within 30 Days	
Parks & Recreation	Beechmont Community Center Attendance	Goal Not Set
	Portland Community Center Attendance	Goal Not Set
	Volunteer Hours	Meets Goal
	Total Revenue	Off Goal
Public Health & Wellness	WIC Potentially Eligible but Not Enrolled Individuals	Off Goal
	Percentage of Public Facilities Not Receiving the Required Number of Inspections	Off Goal
	Percentage of Food Facilities Not Receiving the Required number of Inspections	Approaching Goal

Appendix C

