An Analysis of the Effect of Mayoral Salaries Upon Municipal Expenditures

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ABSTRACT

Gonzalez and Mehay (1985) demonstrate that municipal government expenditures are explained by population size and density, intergovernmental aid and median age of the population. This study extends Gonzalez and Mehay by including a variable to represent the influence which key executives (mayors) may have upon expenditure levels or governmental output. This study also illustrates that the GM model, in this sample, is heteroskedastic; through the use of maximum likelihood estimation, the heteroskedasticity is corrected. Both nested and non-nested model selection techniques are utilized to select the best overall model to explain governmental expenditures. Keywords: expenditures; municipal; mayoral salary

INTRODUCTION

Gonzalez and Mehay, (1985), Giroux (1989), and Giroux and Shields (1993) examined control systems and decision-making in the municipal government setting. Chan and Rubin (1987) also evaluated similar relationships, and examined how information can affect the production and distribution of governmental expenditures. Luehlfing (1996) also examines expenditures and the affect of institutional controls, accounting controls and legitimation tactics upon output. These studies examined the decisions of public officials, and identified relationships between decisions and such factors as the type of government (city managers or mayors), type of placement (elected or appointed), and various accounting and auditing factors. However, to date, no study has examined the effects of personal incentives of key officials upon government decisions or output. Understanding these relationships can aid voters in making informed decisions when electing representatives.

Pre-Keynesian economic literature (Smith, Mandeville) suggests that private vices or motives of officials in the decision-making processes result in public benefit for those governed. This paper investigates financial rewards or salary incentives of key municipal officials (mayors) and the effect of such rewards or incentives upon municipal expenditures.

Through the use of maximum likelihood estimation, this study extends Gonzalez-Mehay (GM) (1985) to include salary as an incentive to remain in office, and indicates that executive compensation levels significantly affect municipal expenditures. This estimation method also illustrates that the GM method of OLS regression was inefficient and that maximum likelihood, which controls for heteroskedasticity, is a more efficient method of estimating governmental expenditures.

Theoretical Development

Public Choice theory indicates that politicians will be motivated by self-interest or job enhancement. According to Gonzalez and Mehay (1985), Giroux and Shields (1993), and Giroux (1989), bureaucrats hold a monopoly position over information and utilize that information asymmetry to manipulate choices and legislative actions to further their own self interest. Inherent in these models is the idea that key executives can affect the production

and distribution of government expenditures (Chan and Rubin 1987).

Self-Interest/ Maximize Personal Benefits	leads to	Manipulate Choices and Actions	leads to	Increased Expenditures or Services

The incentives of elected officials, or politicians, are associated with reelection potential (Giroux 1989; Giroux and Shields 1993). Voters elect officials and favor policies which will lead to the most benefits or services to them individually (Chan and Rubin 1987). Therefore, politicians who desire to be elected or re-elected may manipulate their decision-making to provide more benefits and services to their constituents.

Election or Reelection Desires/ Incentives	leads to	Increased Services or Expenditures

Pre-Keynesian Economic literature, (Smith and Mandeville), also indicates that private vices, (personal incentives or rewards to public officials), will result in public benefits (to those governed). In today's society, the most common method of reward is financial compensation, or salary. Hence, according to economic theory, levels of rewards or salaries of the key official lead to increased/decreased benefits to the public.

Private Incentives or Salaries	leads to	Increased Benefits or Expenditures

Giroux (1989) indicates that salary and benefits act to increase incentives of government employees. Applying this theory to elected officials, indicates that increasing salary and benefits to the politician results in increased incentives to be reelected.

Salary/ Benefits	leads to	Increased Incentives for election/reelection

Municipal executives who receive compensation for their positions and desire to maintain current income levels and financial security may, therefore, develop greater incentives or desire to remain in office or seek re-election than those who receive token salaries or no salary. If, the mayor of Detroit, for example, is motivated by his salary of $120,000.00, he will have greater financial incentive to remain in office than the mayor of Montgomery, Alabama who receives no salary.

MEASURING OUTPUT

In a production setting, output is easily measured in terms of inventory produced, work in process etc. In the governmental setting, output is determined in the level of expenditures for services such as police and fire protection, parks and recreation, and various other services offered within a community. Hence output is an intangible item, and cannot be directly measured. In this setting, therefore, surrogate variables have been developed to represent output. In most governmental literature, expenditure levels are utilized as a measure of output. Gonzalez and Mehay, for example, deduced that government expenditures act as private goods (increasing as population increases) and function as a surrogate for government output. Giroux and Shields (1993) and Giroux

(1989) utilized expenditures as a surrogate for government output. This study, following the Gonzalez and Mehay study also incorporates total government expenditures to represent a measure of government output for a fiscal year.

METHODS

The Gonzalez-Mehay (GM) model is extended to test the effects of executive compensation incentives upon municipal expenditures.

Model I (GM model)

$$LGEXP = a + \beta_1 LPOP + \beta_2 LY + \beta_3 LGOVT + \beta_4 CP + \beta_5 LPDEN + \beta_6 MED + E$$

where:

LGEXP	Log of General Fund Expenditures
LPOP	Log of population
LY	Log of per capita income
LGOVT	Log percent of intergovernment revenues
CP	Log of population change (1970 - 1980)
LPDEN	Log of population density
MED	Population median age

The GM model explained general fund expenditures as a function of various measures of population, per capita income and intergovernmental transfers.

The Gonzalez-Mehay model is extended to include a mayoral salary variable, which represents the log of actual dollar amounts that executives receive for functioning as city mayors.

EMPIRICAL MODELS

The first extension adds the log of mayoral salary variable to the Gonzalez-Mehay model.

Model I (b): (Gonzalez and Mehay + Log of mayoral salary)

$$LGEXP = a + \beta_1 LPOP + \beta_2 LY + \beta_3 LGOVT + \beta_4 CP + \beta_5 LPDEN + \beta_6 MED + \beta_7 LMAYSAL + E$$

where

LMAYSAL	Log of actual mayoral salary

Model I (b) is utilized to extend the GM model to include a variable testing whether mayoral compensation affects government expenditures. The hypothesis related to the inclusion of this variable is:

> **(H1)** Salaries of elected officials (mayors) will increase incentives to remain in office and, subsequently, increase municipal output or expenditures.

In some municipal settings, however, executive decision making may be extended to the city manager rather than the mayor. To test the effect of the presence of a city manager (upon municipal expenditures) the GM model is again extended to incorporate a variable to include the presence or absence of city managers.

Model I (c): Gonzalez and Mehay + form of government (presence or absence of a city manager).

$$\widehat{LGEXP} = a + \beta_1 LPOP + \beta_2 LY + \beta_3 LGOVT + \beta_4 CP + \beta_5 LPDEN + \beta_6 MED + \beta_7 CM + E$$

where:

CM = presence or absence of a city manager

Model I (c) is utilized to test whether the presence or absence of a city manager will affect expenditures. Previous research of the presence/absence of a city manager (Giroux and Shields, 1993) indicates that the presence of a city manager should decrease government expenditures. These bureaucrats are appointed by elected officials and may act only according to the authority granted to them by the appointing board. According to Luehlfing (1996), cities which fill (council) vacancies by appointment exhibit significantly lower expenditures. Thus, applying the concept that appointment of key officials results in lower expenditures, the hypothesis can be generated that cities which appoint/hire city managers will also generate lower expenditures. Furthermore, according to Giroux and Shields (1993), city managers will attempt to demonstrate or signal competence to elected officials, constituents and investors (Giroux and Shields, 1993). City managers are paid bureaucrats, hired and fired according to performance. If performance is measured by cost cutting or maintaining current expenditure levels, the city manager will attempt to control or decrease spending and maintain current levels of services. If the city manager has the authority and the incentive to override mayoral decision making, then, expenditures of cities with a city manager should be lower than cities without a city manager. Hypothesis 2 is:

> **(H2)** Expenditures of cities with a city manager will be significantly less than expenditures of cities with no city manager.

SAMPLE

The data for this study are derived from two sources; the first group of data was gathered via nationwide survey and prepared by the Municipal Year Book Urban Data Service, for the ICMA, a professional association of administrators. The information gathered in these surveys includes: structure of local government, characteristics of key officials, election processes, and mayoral salaries.

The second data base utilized in this study is also derived from information gathered on cities located throughout the United States. The data base was compiled by Giroux and Shields (1993) and consists of information on cities greater than 100,000 in population (for which data were available). Included in this data base is information regarding population, debt levels, general fund expenditures, operating fund expenditures and various other accounting and auditing variables. The Giroux and Shields data base consists of information gathered on 133 United States cities. Data from the ICMA matched with 104 Giroux and Shields cities. Mean Salary of the mayors in this data base is $26,973.68 with a range of $ 0 - 120,000.00.

The ICMA data segregates its data base into population groupings. The largest three population groupings contain the cities which match with the Giroux and Shields data base cities. The populations of these cities range from 100,000 to over 3 million. Mayoral pay status in each of these city population groupings, as illustrated in table 1, included both paid and not paid status. The mean salaries of the mayors of these cities and the range of salaries are both given in table 1.

As shown in table 1, as the population of these cities increases the percentage of mayors who are paid a salary decreases; table 1 further illustrates that the percentage of mayors who are paid a salary below the national poverty level increases with population. Thus, although the populations, and the budgets, of these cities are increasing, the percentage of mayors who are paid a salary above the national poverty level is decreasing.

Table 1
Mayoral Salary by Population Group

Population Group (percentage)	Not Paid Frequency (percentage)	Paid Frequency Maximum Salary	Mean Salary Minimum Salary (percentage)	Pay less than National Poverty Level Frequency
Group 3	4	11	$ 44,647	4
	(26.7)	(73.3)	0	(26.7)
			120,000	
n=73				
Group 2	4	12	$ 34,176	4
	(25.0)	(75.0)	0	(25.0)
			81,973	
n=16				
Group 1	17	56	$ 22,715	18
	(23.3)	(76.7)	0	(24.7)
			73,000	
n=15				
totals	25	79	$ 26,973.68	26
	(24.0)	(76.0)	0	(25.0)
			120,000	
n=104				

Population group 3 500,000 and greater
Population group 2 250,000 - 499,999
Population group 1 100,000 - 249,999

RESULTS

In the original study, Gonzalez and Mehay estimated government expenditures through ordinary least squares regression. An assumption of ordinary least squares regression is the absence of collinearity among the variables. Variance inflation index indicates collinearity among two of the variables, Income and population density. (Variance inflation numbers are reported on table 2). None of the other variables (including the mayoral salary variable) are highly correlated. A second assumption of ordinary least squares regression is the absence of heteroskedasticity (unequal variance of the error terms). According to Greene (384) heteroskedasticity can arise in cross-sectional data from a number of sources, including variances in size of firms (i.e. cities in this study) sampled. In this sample, city sizes range from 100,000 (Albany, New York) to 3,096,000 (Los Angeles, California). Hence, as a result of variances in size of cities represented in this study, heteroskedasticity may be a problem. Therefore, this study includes two tests for heteroskedasticity: Bruesch-Pagan and Koenkar-Basset.

RESULTS OF HETEROSKEDASTICITY TESTS

Both the Breusch-Pagan and the Koenkar-Basset tests reveal that the original Gonzalez-Mehay model I is heteroskedastic. The Breusch-Pagan test generated a value of 13.85 and the Koenkar-Basset test generated a value of 13.91; both of these values indicate

at a .10 significance level that the original GM model is heteroskedastic. Hence, ordinary least squares is less efficient in this setting. Econometric literature suggests that maximum likelihood estimation is more efficient (generates a lower variance) than ordinary least squares regression or generalized least squares in the presence of heteroskedasticity (Saha 1995b). To illustrate the efficiency of maximum likelihood over OLS, both OLS and Maximum likelihood results are included in tables 2 and 3. The coefficients and T-statistics (in parenthesis) are shown on tables 2 and 3. T-values appear stronger in the maximum likelihood models in over half of the variables. The increased efficiency of maximum likelihood is particularly apparent in models I(b) and I(e).

ESTIMATION RESULTS

Overall model results are presented in tables 2 and 3. Maximum likelihood estimation on Model I (b) indicates the variable LMAYSAL, representing log of mayoral salaries is significant at a level of .13.

The LMAYSAL coefficient is positive, which indicates that municipal spending increases with mayoral compensation. This finding supports the hypothesis that as salary increases these executives will increase spending to appeal to the majority of voters. Therefore, extending the GM model to include a variable representing mayoral salary provides an indication that governmental services are not only affected by population characteristics and intergovernmental revenues, but are also affected by salary levels of the mayors.

Variance equation estimates of the heteroskedasticity correction are given below the maximum likelihood estimations. These coefficients indicate significance at a .01 level on the heteroskedasticity corrections.

Maximum likelihood estimation on model I (c) indicates no significance on the presence or absence of a city manager. Thus, the presence or absence of a city manager can not explain municipal expenditures. These results indicate that mayoral salary is a prevailing influence in municipal expenditures, and that the presence or absence of a city manager, does not significantly influence expenditures. Basically, these results indicate that although city managers may have incentives to lower expenditures, the presence or absence of a city manager does not override the incentives of the mayor. Even though city managers have some authority to lower expenditures, the overriding influences, in this study, are population, intergovernmental revenues, personal income, median age and mayoral salaries, which all combine to increase expenditure levels in these cities.

COMPARISON WITH GONZALEZ MEHAY

Table 2
Maximum Likelihood and Regression Analysis of
Mayoral Salary

	MODEL I		MODEL I (b)		MODEL I (c)	
	OLS	ML	OLS	ML	OLS	ML
LPOP	1.17	1.28	1.17	1.27	1.18	1.28
	(18.28)*	(17.78)*	(18.30)*	(17.92)*	(18.13)*	(17.96)*
LY	-.689	-.284	-.801	-.275	-.679	-.266
	(-.458)	(-1.76)*	(-.533)	(-1.72)**	(-.450)	(-1.66)**
LGOVT	.2739	.251.	259	.243	.270	.245
	(3.94)*	(3.582)*	(3.70)*	(3.48)*	(3.86)*	(3.507)*
CP	-.185	-.289	-.750	-.170	-.170	-.260
	(-.288)	(-.399)	(-.116)	(-.235)	(-.264)	(-.360)
LPDEN	.217	-.167	.2052	-.142	.2371	-.1462
	(.307)	(-.234)	(.291)	(-.201)	(.334)	(-.2056)
MED	.3921	.40755E	.4074	.426	.3973	.4121
	(-1.74)**	(1.751)**	(1.81)**	(-1.84)**	(1.76)**	(1.779)**
LMAYSAL			.1327	.1565		
			(1.247)	(1.497)***		
CM					.6222	.1070
					(.663.1)	(1.12)
CNSNT	2.83	3.12	2.77	2.94	2.74	2.97
	(3.36)*	(3.408)*	(3.288)*	(3.22)*	(3.20)*	(3.22)*

Variance Equation Estimates

MODEL	I	I (b)	I (c)
	.043701	.04324	-.04343
	(14.39)	(14.4)*	(14.4)*

MODEL I : LGEXP = LPOP + LY + LGOVT + CP + LPDEN + MED
MODEL I (b) : LGEXP = LPOP + LY + LGOVT + CP + LPDEN + MED + LMAYSAL
MODEL I (c) : LGEXP = LPOP + LY + LGOVT + CP + LPDEN + MED + CM

* Significant at .01
** Significant at .10
*** Significant at .13

Variable	Variance Inflation
LPOP	3.60
LY	28.25
LGOVT	4.2
CP	1.15
LPDEN	24.5
LNW	3.7
LMAYSAL	1.37

In the original study, Gonzalez and Mehay found significance at the .01 level on the population, intergovernmental transfers, population density and median age variables. Under the maximum likelihood estimation, the population and governmental transfers are significant at the .01 level, and median age and income are significant at the .10 level; population density is not significant in the maximum likelihood estimation. The differences in significance levels between the two studies may be a result in the small sample size of the original Gonzalez Mehay study (81 cities), all from one state, and consisted of cities in population of 25,000 and higher, with the largest cities omitted from the study (an attempt to control for heteroskedasticity). This sample is across all states, and includes 104 cities with population greater than 100,000. This sample includes larger cities, and controls for heteroskedasticity through the maximum likelihood estimation, rather than omitting data.

Further Extensions

The data set can be further examined by segregating the mayoral salaries into paid and not paid status. Approximately 25 percent of the cities in the data set do not pay their mayors. From the results indicated previously, [mayoral salary significantly increases expenditures], the following hypothesis can be generated:

> **(H3)** Cities which pay their mayors should show significantly higher expenditures than cities which do not pay their mayors.

Model I (d) is:

$$a + \beta_1 LPOP + \beta_2 LY + \beta_3 LGOVT + \beta_4 CP + \beta_5 LPDEN + \beta_6 MED + \beta_7 PAY/NOPAY + E$$

where:

PAY/NOPAY Mayoral pay status

As indicated on table b, results of maximum likelihood estimation indicate significance at a .15 level on the paid or not paid variable.

Table 3
Maximum Likelihood and Regression Analysis of Interaction Terms

	MODEL I (d)		MODEL I (e)	
	OLS	ML	OLS	ML
LPOP	1.176	1.28	1.18	1.28
	(18.29)*	(17.93)*	(18.37)*	(18.01)*
LY	-.7207	-.2618	-.872	-.285
	(-.4798)	(-1.64)**	(-.580)	(-1.78)**
LGOVT	.2646	.2487	.2479	.233
	(3.787)*	(3.56)*	(3.48)*	(3.299)*
	-.8027	-.1671	-.138	-.229
	(-.123)	(-.231)	(-.213)	(-.3184)
LPDEN	.1941	-.1570	.2503	-.111
	(.2746)	(-.2211)	(.354)	(-.1570)
MED	.4147	4341	.3978	.4213
	(1.84)**	(1.879)**	(1.767)**	(1.829)**
PAY/NOPAY	.1180	.1527		
	(1.08)	(1.43)***		
TOKEN			.2177	.624
			(.163)	(.4678)
FULL			.1642	.1908

			(1.43)	(1.70)**
CNSNT	2.733	2.87	2.79	2.95
	(3.21)*	(3.13)*	(3.29)*	(3.23)*
Variance Equation Estimates				
		.0432		.0430
		(14.4)*		(14.4)*

MODEL I (d) : LGEXP = LPOP + LY + LGOVT + CP + LPDEN + MED + PAY/NOPAY
MODEL I (E) : LGEXP = LPOP + LY + LGOVT + CP + LPDEN + MED + TOKEN + FULL
* Significant at .01 ** Significant at .05 *** Significant at .10

Thus, we are able to conclude that significant differences arise in expenditure levels of cities classified according to paid or not paid status of mayoral salaries. Further exploration of the data set, however, indicates that mayoral salaries in the data set range from $300.00 to $120,000.00. The PAY/NOPAY variable is a 0 -1 dummy, representing paid or not paid status. Thus, in the PAY/NOPAY variable, pay of $300.00 is viewed the same as pay of $120,000.00, and both receive a dummy value of 1. However, approximately 27 percent of these "paid" mayors receive compensation for their position which is below the national poverty level ($12,269.00) for this time period. These "token" salaried mayors may have goals similar to those who receive no salary. Thus, separating by paid or not paid categories may not be the optimal division. Therefore, the model is examined again, utilizing the full and token salaried positions as additional variables ("token" is defined as pay at or below the national poverty level).

Again, from the conclusions generated by the estimation of model I(b), the following hypothesis can be stated:

> H(4) Cities which pay their mayors a "full" salary should exhibit significantly higher expenditures than cities which pay their mayors a "token" salary.

Model I (d) is:

$$LGEXP = a + \beta_1 LPOP + \beta_2 LY + \beta_3 LGOVT + \beta_4 CP + \beta_5 LPDEN + \beta_6 MED + \beta_7 TOKEN + \beta_7 FULL + E$$

where:

TOKEN Mayor paid token salary (salary at or below the national poverty level)
FULL Mayor paid full salary (salary above the national poverty level)

Maximum likelihood estimation indicates significance on the variable, "FULL" , in the direction as anticipated. These results indicate that salaries of key executives do significantly affect municipal expenditures. These results also indicate that level of pay (i.e. full or token) may generate different incentives to remain in office, and as a result, may generate different spending patterns between the two groups.

Table 4
Model Selection Tests
Nested Model Selection Results

Models	Likelihood Ratio	Significance Level
Gonzalez-Mehay Model		
I (b) and I	2.16	.10
I (c) and I	1.28	.20
I (d) and I	1.96	.15
I (e) and I	3.16	.05

Non-Nested Model Selection

	I	I (b)	I (c)	I (d)	I (e)
LLF	-71.57	-70.49	-70.93	-70.59	-69.99
AIC		-78.49	-78.93	-78.59	

Pollak-Wales Selection Criteria		upper bound	lower bound
Model I (b) - I (e)	.50	1.075	.685

where

MODEL I : LGEXP = LPOP + LY + LGOVT + CP + LPDEN + MED + E
MODEL I (b): LGEXP = LPOP + LY + LGOVT + CP + LPDEN + MED + LMAYSAL + E
MODEL I (c): LGEXP = LPOP + LY + LGOVT + CP + LPDEN + MED + CM + E
MODEL I (d): LGEXP = LPOP + LY + LGOVT + CP + LPDEN + MED + PAY/NOPAY + E
MODEL I (e): LGEXP = LPOP + LY + LGOVT + CP + LPDEN + MED + TOKEN + FULL + E

FURTHER ECONOMETRIC ANALYSIS

Further econometric analysis may be conducted to identify the best overall model to explain governmental expenditures.

Non-nested procedures allow any pair of alternative specifications to be tested against each other. Two selection techniques are utilized in this study, Akaike's information criterion (AIC) and Pollak and Wales likelihood dominance criterion (PW). Akaike's information criterion selects the model with the largest value of lnL - k, where lnL is the log likelihood value and k is the number of parameters. PW selects the model with the highest adjusted likelihood value when the number of parameters is the same. When the number of parameters differs, PW takes the difference in log likelihoods and tests this difference via a chi-squared distribution. Models are selected according to lower and upper bound cutoffs calculated according to the number of variables in each model (Saha 1995a).

Nested modeling testing indicates that models I(b), I(d) and I(e) are all significant improvements over the original GM model at significance levels of .10, .15 and.05, respectively. Non-nested testing indicates that model I (b) is superior to both models I (c) and I (d). Both the AIC and the PW non-nested procedures indicate these results. Model I (b) generated an AIC of -78.49; model I (c) generates an AIC of -78.93; and model I (d) generates an AIC of -78.59. Model I (b) AIC is greater than both models I (c) and I(d) AICs and according to Akaike, is the superior model.

The PW LDC coefficient comparing models (b) and (e) is .50, which falls below the calculated lower bound, which indicates that model I(b) is superior to model I(e). Thus, through non-nested model comparisons, model I(b) is identified as an efficient and superior method of estimation of governmental expenditures in the Gonzalez-Mehay framework. Nested and non-nested model selection criteria have indicated that in the Gonzalez-Mehay framework, model I (b) is superior to models I, I (c), I (d) and I (e) . According to both nested and non nested model selection techniques, model I (b) or the model which includes the log of mayoral salary is the most efficient model to describe governmental expenditures.

Thus, according to econometric analysis, the inclusion of the mayoral salary variable in the

original model provides the most efficient explanation of municipal government expenditures.

CONCLUSIONS

This study has achieved three objectives in explaining municipal government expenditures. This study illustrates that (1) the GM method of OLS estimation was less efficient in explaining governmental expenditures than maximum likelihood due to the presence of heteroskedasticity. (2) This study also shows that mayoral salaries significantly affect governmental expenditures; the coefficients indicate that output increases as mayoral salary increases. (3) The study has further shown that when mayors who receive a full-salary (as opposed to those who receive salaries below the national poverty level) will have different incentives to remain in office and, as a result, will increase expenditures to appeal to the majority of voters.

Nested model selection techniques illustrate at a .05 significance level that the GM model was under specified--or omitted key variables in explaining governmental expenditures. Non-nested and nested selection techniques have provided a basis for selecting an overall superior model to explain governmental expenditures. Thus, this study further illustrates that as salary increases, the incentives to remain in office increase, and elected officials attempt to appeal to the majority of voters by increasing services offered or expenditures.

Suggestions for Further Research

The results of this paper indicate that mayoral salaries affect governmental expenditures. The results found in this study provide a basis for further research into both token salary and full salary and the effect of form of government upon municipal output. Further research should also evaluate the effect of counsel member salaries, and the interaction between mayoral pay status, counsel pay status and form of government.

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