

# Analysis of the National Endowment of the Arts Using SAS<sup>®</sup>/STAT

James D. Ryan, Department of Communications  
Emporia State University Emporia, Kansas

## Abstract

The debate concerning the federal government's role in the support of the arts had lasted for over 140 years when, on September 29, 1965, President Lyndon Johnson signed the National Foundation on the Arts and the Humanities Act, establishing the National Endowment for the Arts and the National Endowment for the Humanities. In the subsequent thirty years the National Endowment for the Arts has awarded over 100,000 grants to arts organizations and artists throughout the nation. The number of state arts agencies has grown from 5 to 56. Local arts agencies now number over 3,800. Nonprofit theatres have grown from 46 to over 425, large orchestras have doubled, opera companies have increased six-fold, and there are ten times as many dance companies now as there were in 1965. The following study, using the SAS System examines the relationship between the state of the economy and the amount of federal funding to the arts. A statistical portrait of the relationship between NEA funding and the state of the economy will be provided. The paper uses various SAS procedures such as PROC REG, PROC CORR, and PROC PLOT.

## Introduction

The purpose of this paper is to illustrate how the SAS System may be used to statistically investigate trends in the grant making funds and administrative funds time series for the National Endowment of the Arts (NEA). Numerous SAS/STAT procedures such as PROC REG and PROC CORR are used to accomplish the goal. A regression model is developed in order to estimate the relationship between grant funding, the state of the economy and the political party in office. The SAS procedure PROC PLOT is also used to graphically present the time series.

## The National Endowment for the Arts: A Brief History

Patronage of the arts results from a sensibility that has been prevalent since antiquity. It is borne of the realization that through artistic endeavor we separate ourselves not only from the

other animals inhabiting our planet, but perhaps of greater importance, we are removed, if only for a fleeting moment, from that which is base or dark in our nature. Even before the Iliad was written in the eighth century B.C., we hear of Orpheus, by the power of his music, taming savage beasts and men, or Amphion calming the stones and building the Theban walls. In the arts we have the greatest civilizing force known to man, the most effective means for edification and enjoyment ever devised. Formalized encouragement of the arts is also an acknowledgment that they are an endangered species, ever-fragile and always susceptible to being trampled under the weight of a nation's techno/industrial/military pursuits. The history of patronage spans thousands of years and is not limited to particular cultures or civilizations. The archons, or principal civic and religious leaders, in ancient Greece supported, in various ways, those artists involved in the great yearly religious and theatrical festivals such as the City Dionysia. One of the major reasons for the rise of the Renaissance in sixteenth century Italy was a sense by those who were in positions of power that to support the arts brought them not only aesthetic pleasure and prestige, but also served as a sign of being an enlightened human being. Francis I, who reigned in France from 1515 to 1547, invited and supported artists and writers from other countries and greatly fueled France's rise to preeminence in the areas of art, literature, theatre, dance and music. The world's first National Theatre, The Comedie Francaise, was established in 1680 and supported in part by governmental patronage. In Elizabethan England the Crown's financial support of professional acting companies such as the Lord Chamberlain's Men ( which contained a young writer by the name of William Shakespeare) led to one of the most vital and fruitful eras in the history of theatre . In Russia, despite a slash of funds to the arts by 3/4 since the fall of communism, there are still over 400 state-supported theatres. In Germany, subsidization of the arts is a part of the national consciousness. In 1992, subsidies to the arts in Berlin alone was \$600 million. That same year the National Endowment for the Arts national

budget was \$174 million. While there is documentation to indicate that a similar sensibility, a commitment to federal support for the arts by an enlightened minority, has existed in the United States for in excess of 140 years, those who share this view have been sadly in the minority. It was not until 1965 that President Lyndon Johnson signed the National Foundation on the Arts and the Humanities Act, establishing the National Endowment for the Arts and the National Endowment for the Humanities. The following is a brief chronology of significant dates and events in the journey toward the creation of the National Endowment for the Arts:

1788: President George Washington declares the both arts and sciences are essential to the prosperity of the state and to the ornament and happiness of human life.

1826: John Trumbull, President of the American Academy of Fine Arts, proposed to President John Quincy Adams a Plan for the Permanent Encouragement of the Fine Arts by the National Government.

1859: President James Buchanan appoints a National Arts Commission to promote the arts, but it is abandoned two years later because of a lack of Congressional appropriations.

1879: Representative Samuel J. Cox (D-NY) introduces a Joint Resolution in Congress to establish a council on arts matters. No action is taken.

1909: President Theodore Roosevelt appoints a 30-member Council of Fine Arts, but it is shortly disbanded due to lack of funds.

1934: President Franklin D. Roosevelt establishes the Treasury Department's Section on Painting and Sculpture, the first government bureau involving the arts, which assigns artists to decorate Federal Building around the country.

1935: Public service employment programs are established under the Works Progress Administration: the Federal Writers Program, the Federal Theatre Project, the Federal Art Project, and the Federal Music Project. More than 40,000 artists are directly employed by the government.

1948-49: The country's first local arts agencies are established: the Quincy Society of Fine Arts in Illinois and the Winston-Salem Arts Council in North Carolina.

1949: Congressman Jacob K. Javits (R-NY) introduces House Joint Resolution 104 in the 81st Congress to provide for a national theatre, national opera

and national ballet. The Resolution is not reported out of committee.

1955: President Eisenhower, in his State of the Union Address, advocates the establishment of a Federal Advisory Commission of the Arts: "...the Federal government should do more to give official recognition of the importance of the arts and other cultural activities.

\*\*numerous bills are introduced over the next several years, but no action beyond limited hearings results.

1962: President Kennedy appoints August Heckscher as his Special Consultant on the Arts and asks him to prepare a report on the relationship between the arts and the Federal government.

Jan. 14, 1963: Senator Javits (R-NY) introduces S. 165 to establish a United States National Arts Foundation.

April 11, 1963: Senator Hubert Humphrey (D-MN) introduces S. 1316 to establish a National Council on the Arts and a National Arts Foundation to assist the growth and development of the arts in the United States.

May 28, 1963: August Hecksher submits his report, The Arts and the National Government, which recommends the establishment of an Advisory Council on the Arts and a National Arts Foundation to administer grants-in-aid.

June 12, 1963: President Kennedy establishes the President's Advisory Council on the Arts. We have agencies of the government which are concerned with the welfare and advancement of science and technology, of education, recreation, and health. We should now begin to give similar attention to the arts.

December 20, 1963: The Senate passes S. 2379 to establish a National Council on the Arts and a National Arts Foundation.

August 20-21, 1964: H.R. 9586 to establish a National Council on the Arts passes the House and the Senate.

April 9-10, 1965: The first meeting of the National Council on the Arts starts at the White House with President Johnson swearing in the members.

June 10, 1965: The Senate debates and passes S. 1483 to establish a National Foundation on the Arts and Humanities.

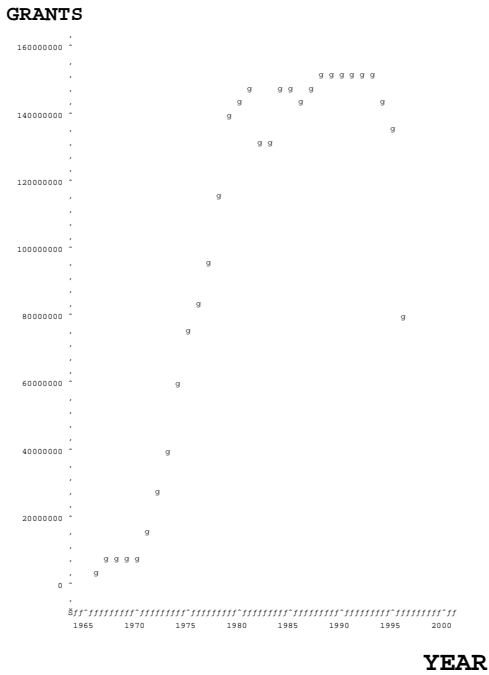
September 29, 1965: President Johnson signs P.L. 89-209, the National Foundation on the Arts and Humanities Act. Art is a nation's most precious heritage. For it is in our works of art that we reveal ourselves, and to others, the inner vision which guides

us as a nation. And where there is no vision, the people perish. The Foundation is composed of the National Endowment for the Arts, the National Endowment for the Humanities, and the interagency committee of Federal officials called the Federal Council on the Arts and the Humanities.

It should be noted that the United States spends 38 cents per capita to support the National Endowment for the Arts. In Canada and France, per capita support of the arts is \$32. The not-for-profit arts create \$37 billion in economic activity and support 1.3 million jobs. They return \$3.4 billion to Federal treasury through income taxes, 20 times the budget of the NEA. Since most NEA grants must be matched at least dollar for dollar, each Endowment grant is a fund raising catalyst leveraging additional contributions from local and state agencies, corporations, foundations, businesses and individuals.

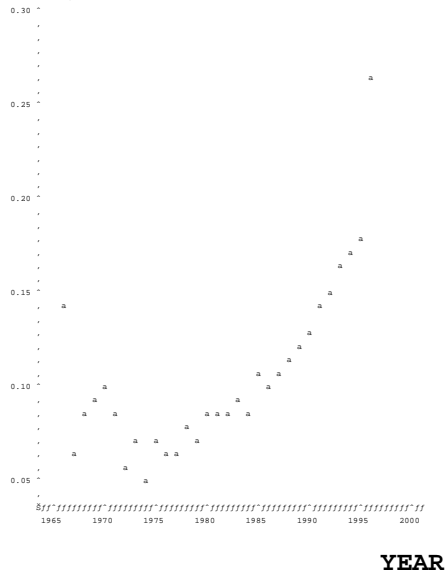
**Plots of Key Variables using PROC PLOT**

**Plot of GRANTS\*YEAR**

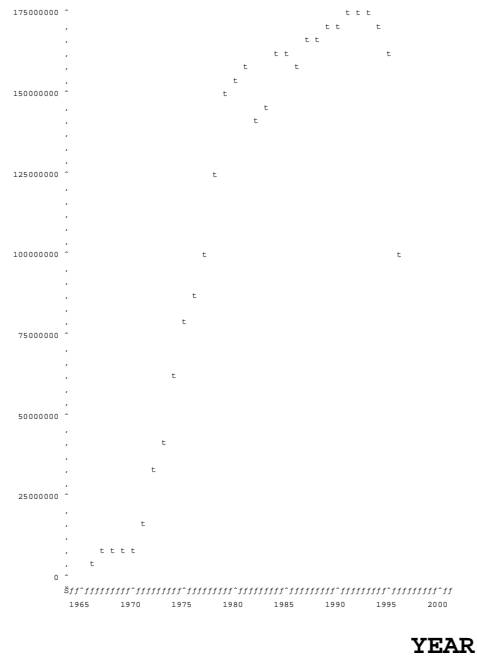


**Plot of ADMINPER\*YEAR**

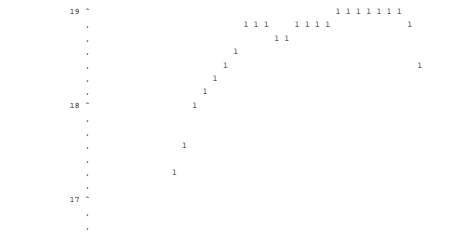
**ADMINPER**

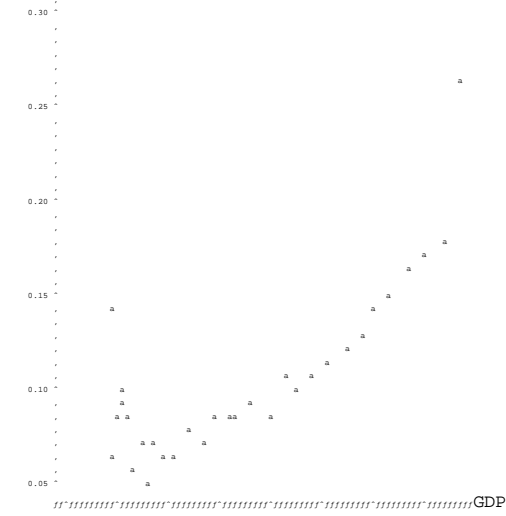
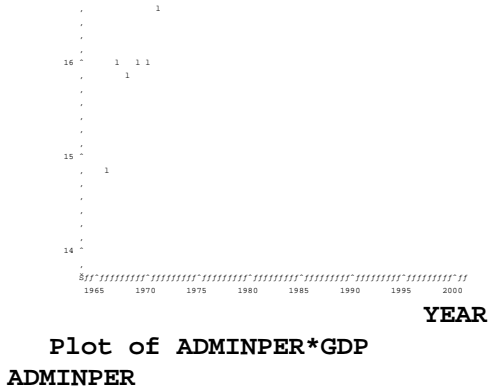


**Plot of TOTFUND\*YEAR**



**Plot of LTOTFUND\*YEAR**





**Empirical Analysis**

**Using PROC REG**

In order to determine whether or not the state of the economy and the current political party in power have an influence on the amount of total funds available to the NEA, an ordinary least squares multiple regression was estimated using PROC REG. The following equation was estimated:

$$Ltotfund = \beta_0 + \beta_1 Lgdp + \beta_2 Party + \mu_i$$

where: Ltotfund natural logarithm of total funds appropriated to the NEA: 1966 - 1996  
 Lgdp natural logarithm of Gross Domestic Product: 1966 - 1996  
 Party Political party in Office: 0 = Republican, 1 = Democrat  
 $\mu_i$  residual error term

Dependent Variable: LTOTFUND  
 Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value
Model	2	33.28427	16.64213	44.337
Error	28	10.51001	0.37536	
C Total	30	43.79428		

Root MSE	0.61266	R-square	0.7600
Dep Mean	18.10949	Adj R-sq	0.7429
C.V.	3.38311		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0
INTERCEP	1	7.044514	1.21251712	5.810
LGDP	1	1.413167	0.15213210	9.289
PARTY	1	-0.316033	0.23001987	-1.374

Next, a regression equation is estimated using the natural logarithm of appropriated grants by the NEA as the dependent variable and the natural logarithm of gross domestic product and the political party as the regressors.

$$Lgrants = \beta_0 + \beta_1 Lgdp + \beta_2 Party + \mu_i$$

where:

Lgrants Natural logarithm of grant making funds appropriated to the NEA: 1966 - 1996

Lgdp Natural logarithm of gross domestic product: 1966 - 1996

Party Political party in Office: 0 = Republican, 1 = Democrat  
 $\mu_i$  Residual error term

Dependent Variable: LGRANTS  
 Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F
Model	2	31.81657	15.90828	39.103
Error	28	11.39115	0.40683	
C Total	30	43.20772		

Root MSE 0.63783 R-square 0.7364  
 Dep Mean 18.00945 Adj R-sq 0.7175  
 C.V. 3.54164

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0
INTERCEP	1	7.231568	1.26232174	5.729
LGDP	1	1.377986	0.15838098	8.700
PARTY	1	-0.340955	0.23946803	-1.424

Finally, a regression equation is estimated using the natural logarithm of appropriated administrative funds by the NEA as the dependent variable and the natural logarithm of gross domestic product and the political party as regressors.

$$LADMIN = \beta_0 + \beta_1 LGDP + \beta_2 PARTY + \mu_i$$

where:

LADMIN Natural logarithm of administrative funds appropriated to the NEA: 1966 - 1996

LGDP Natural logarithm of  
 gross domestic product: 1966 -  
 1996  
 PARTY Political party in Office:  
 0 = Republican  
 1 = Democrat  
 $\mu_i$  Residual error term

made by the NEA: 1966 - 1996  
 GDP Gross domestic product:  
 1966 - 1996  
 $\mu_i$  Residual error term

Dependent Variable: LADMIN  
 Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F
Model	2	48.47102	24.23551	
151.136	0.0001			
Error	28	4.48996	0.16036	
C Total	30	52.96098		
Root MSE		0.40044	R-square	0.9152
Dep Mean		15.69396	Adj R-sq	0.9092
C.V.		2.55158		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0
INTERCEP	1	2.116166	0.79251510	2.670
LGDP	1	1.723608	0.09943528	17.334
PARTY	1	-0.154099	0.15034363	-1.025

Dependent Variable: ADMINPER  
 Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F
Model	1	0.03850	0.03850	
51.991	0.0001			
Error	29	0.02148	0.00074	
C Total	30	0.05998		
Root MSE		0.02721	R-square	0.6419
Dep Mean		0.10605	Adj R-sq	0.6296
C.V.		25.66027		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0
INTERCEP	1	0.049791	0.00920746	5.408
GDP	1	0.000016336	0.00000227	7.210

Durbin-Watson D 0.731  
 (For Number of Obs.) 31  
 1st Order Autocorrelation 0.304

In order to determine whether or not the amount of funds devoted to administration per grants funded shows any trend with respect to year and Gdp, the following two regression equations were estimated:

$$\text{ADMINPER} = \beta_0 + \beta_1 \text{Year} + \mu_i$$

where:

ADMINPER Ratio of  
 administrative costs to Grants  
 made by the NEA: 1966 - 1996  
 Year Year: 1966 - 1996  
 $\mu_i$  Residual error term

Dependent Variable: ADMINPER  
 Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F
Model	1	0.02995	0.02995	
28.930	0.0001			
Error	29	0.03003	0.00104	
C Total	30	0.05998		
Root MSE		0.03218	R-square	0.4994
Dep Mean		0.10605	Adj R-sq	0.4821
C.V.		30.34080		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0
INTERCEP	1	-6.778679	1.28002163	-5.296
YEAR	1	0.003475	0.00064614	5.379

Durbin-Watson D 0.554  
 (For Number of Obs.) 31  
 1st Order Autocorrelation 0.409

$$\text{ADMINPER} = \beta_0 + \beta_1 \text{GDP} + \mu_i$$

where:

ADMINPER Ratio of  
 administrative costs to Grants

**Conclusion**

The results of the regression analysis show that the amount of total funds available to the NEA as well as the amount of appropriated grants and administrative expenditures are significantly related to gross domestic product. In addition, the political party dummy variable indicates that the conventional wisdom which holds that the Democratic party is more amenable to funding of the arts, may be incorrect. For each of these models relatively high R<sup>2</sup> were attained, ranging from 0.73 to 0.92. Finally, the ADMINPER regressions indicate that the amount of administrative funds per year or per GDP are significantly increasing over time, a result which is not favorably looked on by Congress. The SAS System efficiently made the use of the sophisticated statistical procedures in this paper available to a non-statistician, and very importantly, with a short learning curve.

**References**

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**Contact Author:**

The author may be contacted at:

James D. Ryan, Ph.D.

Department of Communications

Emporia State University

Emporia, Kansas 66801

Phone: (316) 341-5256

[ryanjame@esumail.emporia.edu](mailto:ryanjame@esumail.emporia.edu)