What Factors are Associated with Changes in Non-Profit Receipts?*

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June 28, 2006

***Final Project for APEC 5032, Department of Applied Economics, University of Minnesota**

Executive Summary -- What Factors are Associated with Changes in Non-Profit Receipts?
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Non-profit organizations play a key role in providing services to a broad section of society. Non-profit organizations include, but are not limited to, hospitals, foundations, arts organizations, political action groups, child care and adult education programs. U.S. gross receipts of non-profit organizations totaled $2,266 billion in November 2005, or 18 percent of GDP.

In this analysis county-level data is used to assess what factors are associated with changes in the receipts of non-profit organizations. Each county is treated as an individual unit. U.S. county data for gross receipts of non-profit organizations was collected and characteristics that may affect receipts, such as population and population density, income, poverty rate, unemployment rate, median age and other variables were used to help explain changes in counties. The analysis included a data set of counties from 47 states and a subset of the data with the 303 counties in the Ninth Federal Reserve District.

Findings from the analysis include:

- Non-profit services seem to be superior goods since the income elasticity for non-profit receipts is higher than 1. That is, when personal income increases over time and across counties, there is a greater proportional increase in non-profit receipts.

- Counties with relatively higher rates of poverty seem to have slightly more non-profit receipts after accounting for county characteristics compared to counties with lower rates of poverty. This finding suggests that non-profit services are at least as available in areas with a relatively higher percent of population living in poverty compared with counties with lower poverty rates.

- Counties with higher population density tend to have higher levels of nonprofit receipts per capita. However, after accounting for personal income levels and the poverty rate, counties with higher population density are associated with lower levels of non-profit receipts. These results may counter a view that compared with rural areas densely populated urban areas accrue the lion's share non-profit receipts relative to income and poverty trends.

- There are significantly different levels of non-profit receipts among states. This means state specific characteristics, such as tax rates, industry mix, ethnic and immigrant composition of population, and so on, are likely associated with changes in non-profit receipts.

- Characteristics that affect non-profit receipts in the United States broadly tend to hold for the 303 counties in the Ninth Federal Reserve District.

- Specific to the Ninth District, higher rates of unemployment are associated with decreases in non-profit receipts in Ninth District counties. This suggests that weak labor market conditions in a county are associated with lower levels of non-profit receipts. In addition, the analysis shows that counties with a college or university, more large businesses, a Native American reservation, and a relatively older population on average tend to have higher levels of non-profit receipts.

What Factors are Associated with Changes in Non-Profit Receipts?

Introduction

Non-profit organizations play a key role in providing services to a broad section of society. Non-profit organizations include, but are not limited to, hospitals, foundations, arts organizations, political action groups, child care and adult education programs. Gross receipts of non-profit organizations totaled $2,266 billion in November 2005, or 18 percent of GDP.

Non-profit organizations rely on contributions from individuals, businesses and government. Unlike a private company which receives revenue when goods and services are provided, revenue for non-profits primarily depends on the availability of funds from public and private sources. In this analysis county-level data is used to assess what factors are associated with changes in the receipts of non-profit organizations. With this information non-profit groups can better understand patterns in charitable giving and better forecast changes in future funding. Since public charities, which represent almost 60 percent of total expenditure by non-profit organizations, play a key role in providing social services, this analysis can help policy makers better understand what characteristics affect the financial soundness of non-profit organizations.

Research Questions: How well do county characteristics, particularly income, explain changes in gross receipts of non-profit organizations? How do findings for the Ninth Federal Reserve District counties compare with the rest of the country?

The paper is divided into four sections. The first section describes the data used in the analysis, including gross receipts of non-profit organizations and characteristics that may affect receipts. The second lays out the methods used to analyze the data, concluding with two models using ordinary least squares, random effects and fixed effects to predict what factors are associated with changes in non-profit receipts. The first model is applied to a county data set of 47 states and a second expanded model is applied to 303 counties located in the Ninth Federal Reserve District. The third section summarizes the results, including differences between the 47 state and Ninth District models. The fourth provides conclusions from the analysis, including implications for non-profit organizations and policy makers.

Data

This analysis uses county level data to analyze changes in gross receipts of non-profits. Each county is treated as an individual unit. County data are available for gross receipts of non-profit organizations, as well as county characteristics that may affect receipts, such as population and population density, income, poverty rate, unemployment rate, median age and other variables.

Data for gross receipts of non-profit organizations is available at the National Center for Charitable Statistics. Gross receipts include revenue through donations by individuals, businesses, allocations by government and charges for services.

Non-profit receipts are affected by the ability and willingness of individuals, businesses and government to make donations and grants to non-profits. Therefore, data on personal income from the Bureau of Economic Analysis was used as a primary determinant of a county's ability to make contributions to non-profit organizations. In addition, the unemployment rate from the Bureau of Labor Statistics was included as a measure of employment vitality in a county.

The need for services provided by non-profits may also drive receipts. Poverty rate (U.S. Census) was used to represent need for non-profit services in a county. Furthermore, the presence of a hospital will likely affect non-profit receipts of a county; hospitals represent almost 25 percent of total non-profit receipts. Hospital expenditure data from the Census of Government in 1992 (U.S. Census) was used to measure state and local government expenditure to hospitals. The presence of a college or university could influence non-profit receipts; education based non-profits comprise 15 percent of non-profit receipts. In addition, the presence of a Native American reservation may affect receipts.

County characteristics may play a role in charitable giving, including population and population density. Beale Codes from the U.S. Department of Agriculture were used to measure population density. Each of the nine Beale codes classify population density, presence in or proximity to a Metropolitan Statistical Area, and size of city in county (see Data Journal for descriptions). Median age in a county may affect the propensity to donate to a non-profit (U.S. Census). Finally, the number of large business establishments in a county may provide a base for corporate contributions. The number of business

establishments with more than 250 employees was included from the 1997 Economic Census (U.S. Census).

Appendix Tables 1 & 2 include selected descriptive statistics. Average per capita gross receipts for non-profit organizations range from a low of $905 in Louisiana to a high of $8,845 in Massachusetts. Furthermore, based on Beale Codes as described below, the most rural counties in the sample had an average

Methods and Models

The above data was pooled into two panel data sets with statistics from years 1997 to 2003. This time span includes four years of relatively strong economic growth (1997 to 2000), a slowing in economic activity (2001) and two years of moderate recovery (2002 to 2003). (See Appendix Figure 1.) These changes in economic activity span the range of economic conditions that non-profits face when raising revenue.

The first data set, U.S. Data, includes variables for non-profit receipts, personal income, poverty rates, population and Beale codes for 47 states, not including Alaska, Washington D.C., Hawaii and Virginia. The first three of these areas were dropped due to differences in their county geography and delineations compared with the rest of the country. Virginia was dropped because it was missing a number of county data entries.

The second data set, Ninth District, includes the above variables for the 303 counties of the Ninth Federal Reserve District (Minnesota, Montana, North Dakota, South Dakota, Upper Peninsula of Michigan and 26 counties in northwestern Wisconsin). In addition, this data set includes unemployment rate, presence of a Native American reservation, presence of a college or university, state and local government expenditure to hospitals, median age, and number of business establishments above 250 employees.

Two models were specified. The first was applied to U.S. Data using ordinary least squares (OLS), random effects, and fixed effects. I was particularly interested in the difference between OLS and fixed effects. Counties seem to vary a great deal in terms of geography, industry, population, ethnic mix, etc. It may be difficult to capture this variety with independent variables. The fixed effects model controls for differences among counties by assigning a dummy variable to each. Gross receipts of non-profits and personal income

were logged, therefore their relationship in the model expresses an elasticity, particularly an income elasticity.

The first model was also applied to the Ninth District data set using OLS in order to compare results with the U.S. data. This is to determine how non-profit receipts in the Ninth District are similar or different than the full 47 state data set.

First Model – U.S. Data and Ninth District

$$\textbf{lgrnprec} = B_0 + B_1\textbf{lgrincome} + B_2\textbf{poverty} + B_3\textbf{Beale1 ...} + B_{10}\textbf{Beale8} + B_{11}\textbf{y1998 ...} + B_{16}\textbf{y2003} + B_{17}\textbf{state1 …} + B_{31}\textbf{state15} + B_{32}\textbf{state17 …} + B_{62}\textbf{state47}$$

Variables Defined:
lgrnprec: log of real non-profit receipts (used CPI to adjust for inflation)
lgrincome: log of real personal income (used CPI to adjust for inflation)
poverty: percent of population in poverty
Beale1-Beale8: population density (see Data Journal for descriptions); Beale9 is comparison code
Y1998 – y2003: years 1998 through 2003; 1997 is comparison year
state1-state47: state code (See Appendix Table 3); state16 (Louisiana) is comparison state

Second Model – Ninth District

$$\textbf{lgrnprec} = B_0 + B_1\textbf{lgrincome} + B_2\textbf{poverty} + B_3\textbf{unemprt} + B_4\textbf{res} + B_5\textbf{college} + B_6\textbf{medage} + B_7\textbf{busest} + B_8\textbf{Beale1} + B_{15}\textbf{Beale8} + B_{16}\textbf{y1998} + B_{21}\textbf{y2003} + B_{22}\textbf{state21} + B_{23}\textbf{state24} + B_{24}\textbf{state3} + B_{25}\textbf{state39} + B_{26}\textbf{state46}$$

Additional variables in Model 2:
unemprt: unemployment rate, 1997-2003
res: presence of a Native American reservation (1 yes, 0 no)
college: presence of a college or university (1 yes, 0 no)
medage: median age of population, 2000
Notes: In Model 2, state20, 15 counties in the Upper Peninsula of Michigan, is comparison state. State46 represents only the 26 counties Wisconsin in the Ninth District. State and local government expenditure to hospitals was excluded because the data was not current (1992) and had wide fluctuations by county. In addition, when logged, several counties were dropped because of zero values.

Results – Model 1

Table 1 shows the estimated coefficients and standard errors of the U.S. data (47 state) models for ordinary least squares, random effects and fixed effects, followed by results for the Ninth District model for ordinary least squares. All models show relatively robust R-

squared statistics, suggesting that changes in the independent variables account for about 74 percent to 78 percent of the fluctuation in the dependent variable.

All three of the U.S. models follow somewhat similar patterns. For example the log of real personal income (lgrincome) coefficients range from 1.416 for the random effects model to 1.552 for the ordinary least squares model. The OLS and fixed effects coefficients are relatively close. The Ninth District model has a lower coefficient at 1.351. Since the dependent and independent models are both in log form, the coefficients provide an estimate of income elasticity. These coefficients suggest that a 1 percent increase in real personal income is associated with a 1.35 percent to 1.55 percent increase in non-profit receipts. With an income elasticity over 1, the results suggest that the services provided by non-profits are considered superior goods. That is, as personal income increases over time and across counties, there is a greater proportional increase in non-profit receipts.

Table 1. Model 1 Results – U.S. Data and Ninth District

Name	Intercept	lgrincome	poverty	Beale1	Beale2	Beale3	Beale4	Beale5
OLS Coef	**-5.103	**1.552	**0.029	**-0.748	**-0.405	**-0.128	0.055	**0.23
St Error	0.140	0.009	0.002	0.047	0.044	0.041	0.045	0.054
RE Coef	**-3.263	**1.416	**0.016	**-0.367	-0.078	0.165	*0.340	**0.540
St Error	0.313	0.022	0.003	0.114	0.108	0.101	0.111	0.134
FE Coef	**-3.058	**1.539	**-0.011	**-1.241	**-0.868	**-0.520	**-0.304	0.079
St Error	0.117	0.009	0.002	0.047	0.045	0.042	0.046	0.056
ND OLS	**-1.611	**1.351	**0.018	**-0.616	-0.026	-0.077	0.354	**0.442
St Error	0.409	0.033	0.005	0.16	0.237	0.115	0.192	0.137

	Beale6	Beale7	Beale8	y1998	y1999	y2000	y2001	y2002	y2003
OLS Coef	**0.116	**0.343	**-0.117	-0.013	**0.108	**0.085	-0.005	**0.07	**0.164
St Error	0.033	0.033	0.039	0.030	0.030	0.030	0.030	0.030	0.030
RE Coef	**0.297	**0.511	-0.080	-0.013	**0.1	**0.071	-0.007	**0.064	**0.16
St Error	0.082	0.082	0.096	0.012	0.012	0.013	0.012	0.012	0.013
FE Coef	**0.297	**0.511	-0.08	-0.013	**0.1	**0.071	-0.007	**0.064	**0.16
St Error	0.082	0.082	0.096	0.012	0.012	0.013	0.012	0.012	0.013
ND OLS	0.021	**0.306	0.051	-0.075	0.075	0.076	-0.025	0.104	0.123
St Error	0.089	0.074	0.072	0.082	0.082	0.082	0.082	0.082	0.082

	Observations Read	Observations Used	Adj R-Squared
U.S. OLS	20798	20512	0.772
ND OLS	2121	2090	0.741

The poverty coefficients are all significant at the 99% level, however, the effect sizes seem to be relatively modest. It seems that a 1 percentage point increase in the poverty rate, let's say from 8 percent to 9 percent, is associated with a slight increase in non-profit receipts, no more than 3 percent. Since most of the coefficients are positive, it seems that the presence of higher poverty rates is at least not associated with a decrease in non-profit receipts. A positive response to the need for services for people living in poverty is one possible interpretation.

There is more divergence among the four models in regards to population and population density, that is Beale codes. All four models have negative coefficients for Beale1 and Beale2. Beale1 for fixed effects is the lowest at -1.241, that is, the most densely populated counties are associated with about a 125 percent decrease, all else equal, in non-profit receipts compared with Beale9, the most rural and sparsely populated designation. The random effects model was only -0.367 for Beale1, the most densely populated designation. The negative signs for Beale1 and Beale2 suggest that as population density increases, non-profit receipts decrease.

Beale5 and Beale7 consistently rank near the top for the highest coefficients, defined as "urban population of 20,000 or more, not adjacent to a metro area" and "urban population of 2,500 to 19,999, not adjacent to a metro area" respectively. In the U.S. OLS model, Beale codes are significantly different from each other, except for pairs Beale3 & Beale8 and Beale4 & Beale6.

Models were first run with Beale codes and then were run by substituting Beale codes with population. Both Beale codes and population had similar effects, that is, there was a statistically significant negative coefficient for population – as population increased across time and counties, non-profit receipts decreased. Beale codes were selected for the model instead of population since they provide more information about the density of county population and proximity to Metropolitan Statistical Areas.

It is important not to confuse this result with per capita non-profit receipts by Beale code (see Appendix Table 2). While per capita non-profit receipts increase as Beale codes decrease (population becomes more dense), once personal income, poverty rate, and other variables are considered, the relationship between non-profit receipts and population density seems to reverse.

State dummy variables were all significant at the 99% level, except for Nevada, which was not significant, and Georgia, which was significant at the 95% level. All values refer to Louisiana, the state not included in the dummy variables. North Dakota had the highest value at 2.52, which suggests that after controlling for independent variables, North Dakota's county level of non-profit receipts were about 250 percent higher than Louisiana. Appendix Table 3 lists the estimated coefficients and standard errors for 46 states. The coefficients are roughly statistically significant between states if the addition of the coefficients' standard errors is smaller than the difference between the coefficients. The dispersion among state coefficients (see Appendix Table 2 for method to compare differences between state coefficients) shows that differences among states have a notable impact on non-profit receipts at the county level.

The Ninth District model mirrored the three U.S. models relatively well, except the coefficients for several Beale codes and year dummy variables lost significance in part due to the decrease in sample size. The lower log of real income coefficient suggests that the income elasticity of giving to non-profits is slightly lower in the Ninth District compared with the full 47 state sample.

Table 2. Model 2 Results – Ninth District

Name	Interc	lgrincome	poverty	unemprt	res	college	medage	busest	Beale1
ND OLS	**-2.01	**1.299	**0.038	**-0.068	**0.201	**0.345	**0.026	**0.003	**-0.482
St Error	0.651	0.038	0.007	0.016	0.058	0.079	0.007	0.001	0.169
	Beale2	Beale3	Beale4	Beale5	Beale6	Beale7	Beale8	y1998	y1999
ND OLS	-0.031	0.173	0.331	**0.489	0.143	**0.351	0.101	-0.082	0.103
St Error	0.235	0.124	0.197	0.15	0.092	0.078	0.072	0.081	0.081

	y2000	y2001	y2002	y2003	state21	state24	state32	state39	state46
ND OLS	0.081	-0.013	0.146	*0.191	**1.055	**0.871	**1.321	**0.821	**0.605
St Error	0.082	0.081	0.082	0.083	0.123	0.127	0.136	0.136	0.141

Number of Observations Read: 2,121 *Significant at 95% confidence level.
Number of Observations Used: 2,083 **Significant at 99% confidence level.
Adjusted R-Squared: 0.7483

Results – Model 2

Results for Model 2 (Table 2) using the Ninth District data set were relatively close to Model 1. Additional independent variables include the unemployment rate, presence of a Native American reservation or college, median age, and number of business establishments

over 250 employees. These additional variables increased the adjusted R-squared from 0.741 to 0.748. Accounting for these additional variables modestly decreased the coefficient for real personal income.

A higher unemployment rate is associated with lower non-profit receipts. A one percentage point increase in the unemployment rate, for example from 5 percent to 6 percent, is associated with about a 7 percent decrease in non-profit receipts. The presence of a college or university in a county is associated with 35 percent more non-profit receipts. The presence of a Native American reservation is associated with about a 20 percent increase. The former is intuitive since colleges and universities comprise a notable share of non-profit receipts. The later suggests that counties with Native American reservations have a notable presence of non-profits to serve the needs of native populations.

Both higher levels of the median age and the number of business establishments with 250 or more employees have a statistically significant association with non-profit receipts, however, the effect sizes are modest. One additional year in the median age is associated with almost a 3 percent increase in non-profit receipts, suggesting that older populations may contribute more to non-profits, all else equal. An additional business with 250 employees is associated with a 0.3 percent increase in non-profit receipts. This provides some evidence that the presence of larger companies may have a positive effect on non-profit receipts.

Conclusions

Results from both models provide a number of insights into changes in non-profit receipts. First, non-profit services seem to be superior goods since the income elasticity for non-profit receipts is higher than 1. That is, when personal income increases over time and across counties, there is a greater proportional increase in non-profit receipts.

Second, counties with relatively higher rates of poverty seem to have slightly more non-profit receipts after accounting for county characteristics compared to counties with lower rates of poverty. This finding suggests that non-profit services are available in areas where people living in poverty may need them. Furthermore, counties with higher population density are associated with lower levels of non-profit receipts. These results may counter a conventional view that big cities accrue the lion’s share non-profit receipts and

rural counties are left wanting. However, after accounting for income, population and poverty, this doesn't seem to be the case, particularly for counties with Beale codes 5 and 7.

Third, there are significantly different levels of non-profit receipts among states. Including additional independent variables may help explain why these differences exist. For example, perhaps states with higher personal income taxes, corporate taxes or tax credits for charitable donations induce higher levels of giving to within state non-profit organizations. Higher income tax rates reduce the price of giving to non-profit organizations since the corresponding reduction in total income results in a larger reduction in tax burden compared with states that have relatively low tax rates. This finding is consistent for both the large data set of U.S. counties and the Ninth District.

Fourth, characteristics that affect non-profit receipts in the United States broadly hold for the 303 counties in the Ninth Federal Reserve District. The expanded model for the Ninth District counties shows that higher rates of unemployment are associated with decreases in non-profit receipts in Ninth District counties. This suggests that weak labor market conditions in a county are associated with lower levels of non-profit receipts. In addition, the analysis shows that all else equal, counties with a college or university, more large businesses, a Native American reservation, and a relatively older population tend to have higher levels of non-profit receipts.

Using county data to investigate trends in non-profit receipts and other economic trends has some short comings. Counties vary across the country, and therefore it is difficult to account for differences between counties when using regression analysis. Modeling with OLS and fixed effects models may help determine whether differences between counties can be accounted for by including key independent variables. Furthermore, the error terms for counties may not be homogeneous and therefore a generalized least squares (GLS) model may be required.

In addition, econometric tools should be applied to these models to determine whether serial correlation is present across time. This data set includes seven years of data and it's likely that error terms from one period might carry over to the next. Again, a GLS model could adjust for problems that might arise regarding serial correlation.

Finally, running the models using receipt data for the three broad categories of non-profits – public charities, foundations and other non-profits – separately would help determine whether there are differences among them.

Appendix Table 1.

Average Per Capita Gross Receipts for Non-Profit Organizations by County, 2003

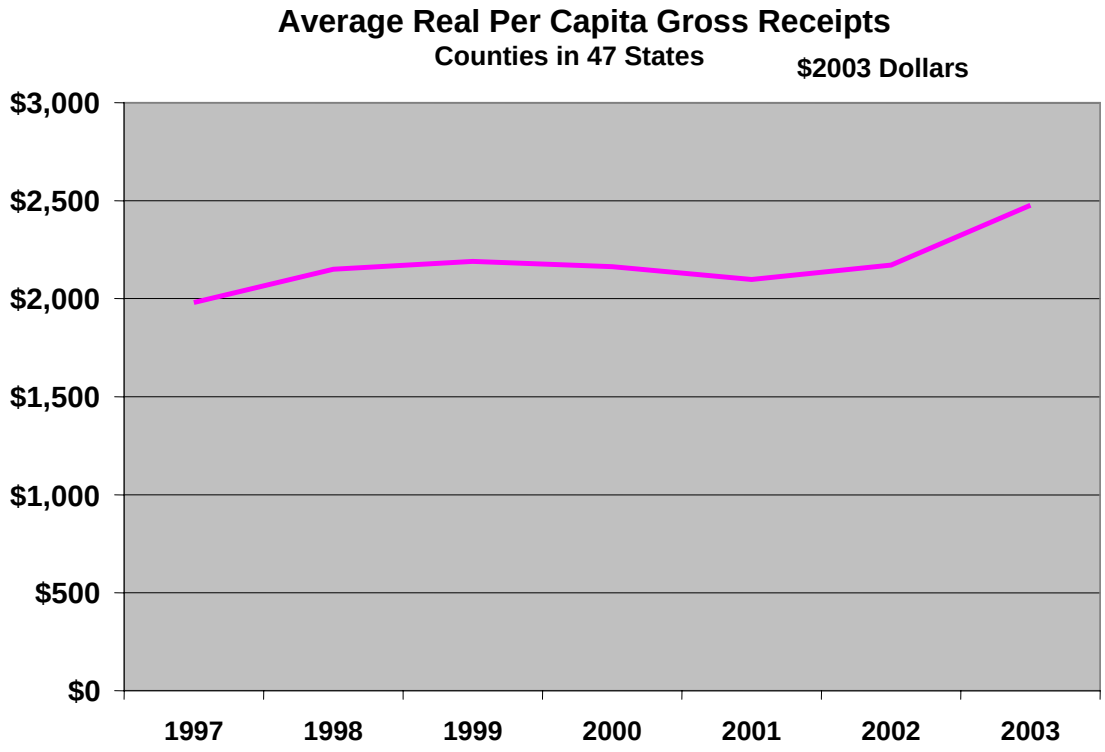
Top and Bottom States

1	Massachusetts	$8,845
2	New Hampshire	$5,890
3	Connecticut	$5,888
4	Maryland	$5,791
5	Rhode Island	$5,603
43	Alabama	$1,151
44	Nevada	$993
45	Idaho	$967
46	Utah	$942
47	Lousiana	$905

Appendix Table 2.

U.S. Counties in 47 States					
Averages by Beale Code					
$2003 Dollars	**Beale1**	**Beale2**	**Beale3**	**Beale4**	**Beale5**
Per capita non-profit receipts	$3,250	$2,826	$2,607	$2,130	$2,824
Per capita personal income	$28,788	$24,910	$23,265	$22,683	$22,772
Poverty Rate	9.8	12.1	13.2	13.5	14.5
	Beale6	**Beale7**	**Beale8**	**Beale9**	
Per capita non-profit receipts	$1,512	$1,817	$1,100	$1,167	
Per capita personal income	$20,623	$21,420	$20,108	$20,869	
Poverty Rate	15.5	15.4	15.6	15.4	

Appendix Figure 1.



Appendix Table 3.

47 State Regression -- State Dummy Variables

State	Variable Name	Estimated Coefficient	Standard Error
Nevada*	state26*	0.05	0.13
Alabama**	state1**	0.18	0.08
Georgia	state9	0.33	0.07
Idaho	state10	0.40	0.09
California	state4	0.50	0.08
Florida	state8	0.55	0.08
Utah	state42	0.59	0.10
Washington	state44	0.63	0.09
Tennessee	state40	0.64	0.07
Texas	state41	0.64	0.06
Arkansas	state3	0.70	0.07
Oklahoma	state34	0.71	0.07
Mississippi	state22	0.72	0.07
Kentucky	state15	0.79	0.07
Arizona	state2	0.80	0.13
North Carolina	state31	0.84	0.07
South Carolina	state38	0.84	0.08
New Mexico	state29	0.94	0.09
New Jersey	state28	0.99	0.11
Michigan	state20	0.99	0.08
Missouri	state23	1.01	0.07
Oregon	state35	1.10	0.09
Ohio	state33	1.12	0.07
Colorado	state5	1.13	0.08
West Virginia	state45	1.13	0.08
Connecticut	state6	1.16	0.17
Maryland	state18	1.22	0.11
Kansas	state14	1.26	0.07
Delaware	state7	1.27	0.26
Wisconsin	state46	1.28	0.08
Illinois	state11	1.29	0.07
Wyoming	state47	1.29	0.11
Indiana	state12	1.31	0.07
Pennsylvania	state36	1.35	0.08
Nebraska	state25	1.39	0.08
New York	state30	1.40	0.08
Iowa	state13	1.42	0.07
Massachusetts	state19	1.52	0.13
New Hampshire	state27	1.61	0.15
Vermont	state43	1.68	0.13
Maine	state17	1.71	0.12
Minnesota	state21	1.81	0.08

South Dakota	state39	1.91	0.08
Montana	state24	1.94	0.08
Rhode Island	state37	2.00	0.20
North Dakota	state32	2.52	0.09

*Only state variable not significant at the 99% level

**Significant at 95% level, all other state variables are significant at the 99% level.

Note: The coefficients are roughly statistically significant between states if the addition of the coefficients' standard errors is smaller than the difference between the coefficients.
However, this formula assumes no covariance between state dummy variables – covariance is likely.

Example:		**Estimated Coefficient**	**Standard Error**
Alabama**	state1**	0.18124	0.07665
Idaho	state10	0.39705	0.08845
Difference between coef. =		0.21581	
Addition of standard errors =			0.1651

(smaller than difference between coefficients)

The appropriate statistical test (using SAS) confirms that the difference between estimated coefficients for Alabama and Idaho are statistically significant
(although covariance isn't accounted):

Statistical test of state1 - state10 = 0
F Value = 6.13, Pr >F = 0.013