

# **Fifty Herbert Hoovers and the Effect of State and Local Government on Gross State Product**

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## **Introduction:**

In the ongoing discussion about the effectiveness of government spending during recessions, most attention is paid to the discretionary policy of the federal government. However, as Table 1 shows, the combined purchases of state and local governments far exceed that of the federal government, along with the gross value-added contributions to GDP and, by far, the numbers of government employees. Thus, the behavior of state and local governments (SLGs) are a crucial part of any economic recovery.

The balanced budget requirement most states face require them to become, in Krugman's phrase,<sup>2</sup> "Fifty Herbert Hoovers." As tax collections decline, state and local governments are faced with a choice of cutting expenditures or finding additional tax revenues, both of which inhibit a recovery in spending. These budgetary economies also come with a lag, as these governments are able to find reserves in the short run, and so in a serious recession the national recovery could potentially be dampened by their fiscal crises.

But for others, a recession is an opportunity to rein in state and local government spending which may have grown too rapidly during periods of flush revenues. Taxes should not be raised during recessions, the argument goes, because they affect the incentive for production and relocation, and reducing the size of state and local governments will better promote private economic activity and improve overall economic growth.

In the short run, this hinges on the question of whether fiscal policy is effective during recessions, as Keynes would have argued, and whether the balanced budget multiplier (i.e., the government purchases multiplier less the tax multiplier) is positive or not. The new classical counterargument is that crowding out in consumption, private investment, and net exports effectively renders fiscal interventions moot, an argument that would apply in particular to an economy near full employment. In the long run, this hinges on the relative social value of providing public goods such as education, public safety, and infrastructure versus the disincentives that higher tax rates have on job creation and interstate migration.

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<sup>2</sup> Krugman, Paul (2008), "Fifty Herbert Hoovers," *New York Times*, Dec. 28.

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**Table 1: Federal, State & Local Government Shares (2009)**

	<u>Total</u>	<u>Federal</u>	<u>Share</u>	<u>State</u>	<u>Local</u>	<u>SLG</u> <u>Share</u>
Total Current Expenditures*	\$4,999	\$3,458	69%	\$1,421	\$1,115	51%
Government Purchases	\$2,915	\$1,140	39%	[ \$1,775 ]		61%
Gross Value-Added	\$1,760	\$552	31%	[ \$1,209 ]		69%
Government Employment	22,516	2,830	13%	5,182	14,504	87%
Share of GDP:						
Total Current Expenditures	35%	24%		10%	8%	
Government Purchases	21%	8%		[ 13% ]		
Value-Added Production	12%	4%		[ 9% ]		
Share of Labor Force:	15%	2%		3%	9%	

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*Note: Data from Bureau of Economic Analysis (<http://www.bea.gov>); Dollar amounts in billions, employment in thousands. Total current expenditures do not adjust for the double-counting of pass-through funds, grants and transfers.*

### **Analysis:**

What does the data tell us? Is the contribution of state and local governments positive or negative on the margin?

To answer this question, I use BEA Gross State Product (GSP) data to estimate whether changes in state and local government (SLG) production, the gross value-added contribution to GSP, have any effect on total GSP. Total GSP is deflated by the Consumer Price Index, but not by population because I want to capture both changes in productivity and changes in state population that may result from job creation in the private sector.

The BEA GSP data includes the goods and services produced by state and local governments (SLGs), in terms of gross value-added. Thus, it includes wages and salaries for all government employees, but excludes transfers that flow through government to private individuals and firms.

These data are available for all fifty states plus the District of Columbia, for all years since 1963. There is a redefinition of GSP in 1997, from SIC to NAICS, which does not affect growth rates because both measures are provided for the transition year. The average change from the redefinition, to both GSP and SLG value-added, is about 1%, and the weighted SLG/GSP share falls from 8.66% to 8.64%. As I consider this difference trivial, I do not worry about adjusting for the redefinition.

The basic model is:

$$[1] \quad g_{\text{GSP}}(i,t) = \beta_i + \beta_{\text{SLG}} g_{\text{SLG}}(i,t-1) + \varepsilon(i,t)$$

where  $g_{\text{GSP}}(i,t)$  is the annual growth rate of CPI-deflated Gross State Product for state  $i$  and year  $t$ , and  $g_{\text{SLG}}$  is the annual deflated growth rate of the state & local government contribution to GSP, for the prior year. This model is estimated in OLS form, where  $\beta_i = \beta_0$  for all  $i$ , and using a fixed effects model for which each state's  $\beta_i$  is estimated separately.

Two additional variables are then considered in these regressions. First, for each state I test whether the effectiveness of the changes in the SLG variable is affected by the business cycle. I calculate a simple exponential trend in real GSP, and then divide that into real GSP to derive an index of GSP relative to trend (i.e.,  $RTT$ ). Second, I consider whether the relative size of state & local government production (i.e.,  $SHR = \text{SLG}/\text{GSP}$ ) affects the growth of GSP or the effectiveness of changes in SLG. The revised regression is:

$$[2] \quad g_{\text{GSP}}(i,t) = \beta_i + \beta_{\text{SLG}} g_{\text{SLG}}(i,t-1) + \beta_{\text{RTT}} RTT(i,t-1) + \beta_{\text{SHR}} SHR(i,t-1) \\ + \gamma_{\text{RTT}} g_{\text{SLG}}(i,t-1) RTT(i,t-1) + \gamma_{\text{SHR}} g_{\text{SLG}}(i,t-1) SHR(i,t-1) + \varepsilon(i,t)$$

Results are shown in Table 2, for the simple model in [1] and the one model in [2], plus three restricted versions: (a)  $\gamma_{\text{RTT}} = \gamma_{\text{SHR}} = 0$ ; (b)  $\beta_{\text{SHR}} = \gamma_{\text{SHR}} = 0$ ; and (c)  $\beta_{\text{RTT}} = \gamma_{\text{RTT}} = 0$ . Each is estimated using ordinary least squares (OLS) and fixed effects (FE), and reported with  $t$ -statistics and adjusted  $R^2$  statistics.

In each of these regressions, the real growth rate of value-added from state and local governments has a positive effect on the state's real GSP growth rate in the succeeding year. In all but one regression, the effect is significant at the 95% confidence level, and in simpler versions where the SLG share does not confound the effect the confidence level is 99.9% or more.

The stage of the business cycle has a significant effect on growth, and the marginal effectiveness of SLG growth, as well. When real GSP is high, relative to the state's trend, GSP growth tends to be higher the following year, but the effect of SLG growth is lower. This result is consistent with the hypothesis that economies experience crowding out as they near full employment.

In the two OLS models (2 and 2.b), the coefficient estimates suggest that the effectiveness of SLG growth falls to zero when the prior year's GSP is 12-13% above the trend. In the two fixed effects models, this range is 16-23% above trend. When GSP is at the trend average, however, a coefficient of 0.20 for  $\beta_{\text{SLG}}$  indicates that a 10% change in real SLG value-added leads to a 2% change in real GSP. Since the SLG/GSP ratio averages a little less than 10%, this would suggest a \$1 increase in real SLG value-added has an average impact of \$2 or more on GSP in the following year. If the economy is in a serious recession, and operating below the long-run trend, this impact rises proportionately.

**Table 2: Regression Results for 50 States & DC, 1965-2009, 2295 observations**

Version	$\beta_0$	$\beta_{SLG}$	$\beta_{RTT}$	$\beta_{SHR}$	$\gamma_{RTT}$	$\gamma_{SHR}$	Adj. R <sup>2</sup>
1 (OLS)	<b>0.025</b> (23.93)	<b>0.262</b> (10.86)					0.0485
1 (FE)		<b>0.224</b> (11.18)					0.5482
2 (OLS)	0.009 (1.52)	0.173 (1.51)	<b>0.187</b> (14.11)	<b>0.209</b> (3.34)	<b>-1.486</b> (6.20)	0.297 (0.23)	0.1411
2 (FE)		<b>0.226</b> (2.37)	<b>0.204</b> (13.89)	<b>0.181</b> (2.26)	<b>-0.952</b> (3.17)	-0.860 (0.78)	0.6003
2.a (OLS)	0.061 (1.30)	<b>0.216</b> (9.24)	<b>0.124</b> (14.28)	<b>0.224</b> (4.35)			0.1269
2.a (FE)		<b>0.159</b> (8.05)	<b>0.173</b> (16.48)	<b>0.149</b> (2.10)			0.5996
2.b (OLS)	<b>0.027</b> (26.58)	<b>0.196</b> (8.36)	<b>0.183</b> (13.81)		<b>-1.517</b> (6.39)		0.1351
2.b (FE)		<b>0.144</b> (7.35)	<b>0.198</b> (13.72)		<b>-0.926</b> (3.11)		0.5994
2.c (OLS)	<b>0.018</b> (2.98)	0.211 (1.77)		0.086 (1.32)		0.616 (0.45)	0.0493
2.c (FE)		<b>0.234</b> (2.42)		-0.115 (1.43)		-0.177 (0.16)	0.5487

Note: *t*-statistics in parentheses, **bold** = statistically significant at 5%

Finally, the share of GSP produced by state and local governments has a positive effect on the succeeding year's growth, as long as the stage of the business cycle, relative to trend, is also included. This effect becomes statistically insignificant otherwise, and the impact on the

marginal effect of SLG growth is also consistently insignificant. That is, the effect that SLG growth has on GSP growth is not significantly affected by the relative size of state and local governments.

Before moving on to the particular case of Nevada, I perform one more asymmetry test. If we assume that state and local governments prioritize their spending, then what they are already producing is likely to have more social value than what they have yet to produce. If this higher social value translates into economic growth, and if the effects of state and local production are more microeconomic than macroeconomic in nature, then we might expect that reductions in SLG should have a bigger impact than increases.

To test this, I re-estimate the simple model [1], with the following change:

$$[3] \quad g_{GSP}(i,t) = \beta_i + \beta^+_{SLG} g^+_{SLG}(i,t-1) + \beta^-_{SLG} g^-_{SLG}(i,t-1) + \varepsilon(i,t)$$

where  $g^+_{SLG}$  includes only positive values and  $g^-_{SLG}$  includes only negative values, with zeroes otherwise. In both the OLS and the fixed effects estimates, the value of  $\beta^+_{SLG}$  is less than  $\beta^-_{SLG}$ , but the difference is not statistically significant. Thus, I conclude that the stage of the business cycles is a much more important determinant of the effectiveness of SLG production than whether the change is positive or negative, at least in the short run where microeconomic spending effects are likely to dominate the microeconomic effects of public infrastructure and investment.

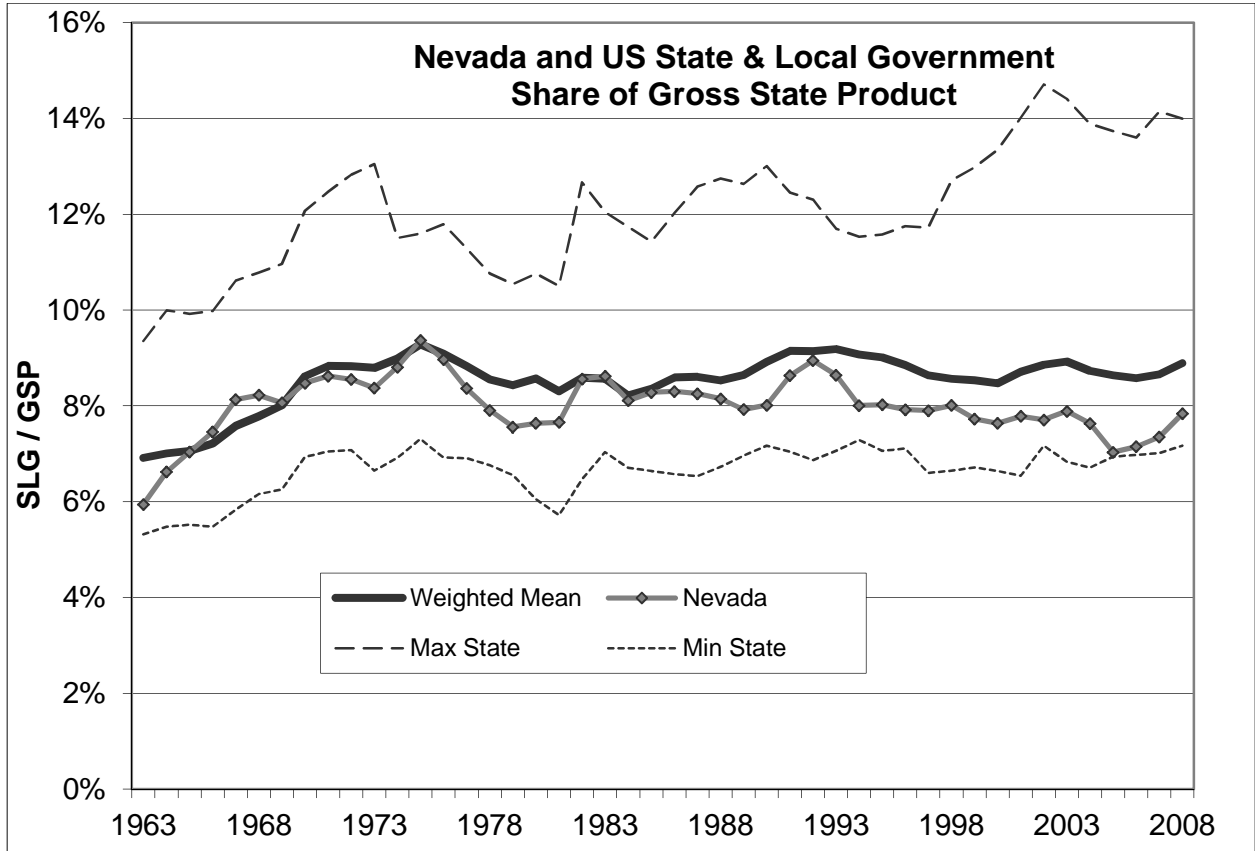
### **The Case of Nevada:**

For the two decades prior to the current recession, Nevada was the fastest-growing state in the nation, with one of smallest state and local governments. While Nevada's per-capita income and cost of living were roughly 10% above the national average, so that unadjusted per-capita SLG expenditures did not appear that low, the number of state and local employees as a share of population ranked 50<sup>th</sup> in the nation.

Using the BEA GSP data in this analysis, Nevada SLG/GSP share is shown in Figure 1 relative to the mean, the minimum state share, and the maximum state share. The mean is calculated by summing up all SLG production and dividing by all GSP, so as not to weigh Wyoming the same as California. The weighted average is closer to the minimum than to the maximum, meaning that bigger states tend to have smaller shares on average.

The top ten states with the highest SLG/GSP shares over the last decade include, from highest to lowest, New Mexico, West Virginia, Mississippi, South Carolina, Oklahoma, Montana, Wyoming, Alabama, Idaho, and Nebraska. The ten states with the lowest shares include, from highest to lowest, Texas, Virginia, Indiana, Tennessee, Colorado, Connecticut, Illinois, Nevada, New Hampshire, Pennsylvania, Massachusetts, and Delaware. While there are some exceptions,

states with larger populations and/or more compact geography tend to have smaller SLG/GSP shares. Nevada, however, is one of the outliers to this pattern.



**Table 3: Nevada's Average SLG/GSP Ratio**

	<u>1963-1972</u>	<u>1973-1982</u>	<u>1983-1992</u>	<u>1993-2002</u>	<u>2003-2008</u>
Nevada	7.7%	8.3%	8.3%	7.9%	7.5%
State Mean	7.8%	8.7%	8.7%	8.8%	8.7%

How does Nevada compare? First, while this measure of government size has not shown much directional trend on average, Nevada has trended downwards, relative to other states. Nevada's ratio ranked 31<sup>st</sup> out of 50 states for the first decade of the sample, but 46<sup>th</sup> out of 50 over the last ten years in spite of its smaller population and larger geographic size. In spite of concerns from

some corners about unsustainable government spending, Table 3 shows that Nevada had a *lower* average SLG/GSP share from 2003-2008 than it did from 1963-1972, even though there was a significant devolution of responsibility from the federal government to the states in the 1970s and 1980s.

The models above are re-estimated for Nevada alone, to check if Nevada is also an outlier in the effect of its SLG value-added on GSP growth. The results are reported in Table 4. While these regressions for Nevada do not contradict the overall results for the fifty states and D.C., the degrees of freedom are not sufficient to have high confidence in all of the results. The effect of SLG growth on GSP growth in the following year is positive and of comparable magnitude, but the standard errors are high and the t-statistics are not statistically significant.

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**Table 4: Regression Results for Nevada, 1965-2009, 45 Observations**

Version	$\beta_0$	$\beta_{SLG}$	$\beta_{RTT}$	$\beta_{SHR}$	$\gamma_{RTT}$	$\gamma_{SHR}$	Adj. R <sup>2</sup>
1 (OLS)	<b>0.044</b> (4.16)	0.229 (1.36)					0.0191
2 (OLS)	-0.188 (1.75)	0.557 (0.43)	<b>0.434</b> (2.32)	<b>2.970</b> (2.16)	-0.194 (0.06)	-5.572 (0.33)	0.4896
2.a (OLS)	-0.157 (2.74)	0.130 (1.09)	<b>0.444</b> (5.63)	<b>2.574</b> (3.62)			0.5129
2.b (OLS)	<b>0.049</b> (5.58)	0.157 (1.15)	<b>0.496</b> (2.42)		-0.936 (0.25)		0.3587
2.c (OLS)	-0.208 (1.50)	0.778 (0.47)		3.178 (1.79)		-7.494 (0.35)	0.1387

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Note: t-statistics in parentheses, **bold** = statistically significant at 5%

As in the larger sample, Nevada tends to grow faster when its prior year GSP was already high, and this effect is significant. However, while the estimated effect of lagged SLG growth is positive, the effect is not statistically significant given the limited number of observations. Similarly, the effect diminishes as the economy is closer to full employment, but the statistical significance is particularly low. Instead, Nevada tends to grow faster when its SLG share is larger, and this effect was significant at the 95% level in models (2) and (2.a), but only at 90% in

model (2.c). As with the larger sample, the relative size of state and local government had no significant effect on the impact of SLG growth. Thus, we can certainly conclude that Nevada does not appear an exception to the overall conclusion that state and local government has a positive effect on a state's economic growth (and certainly not a negative one).

### **Conclusion:**

In this analysis, I used a simple panel data approach with both OLS and fixed effects to test whether the value-added produced by state and local governments has any effect on gross state product in the following year. These value-added data measure primarily the cost of state and local employment, and do not include transfers to private firms or individuals. The results strongly support the argument that the net effect of state and local governments is positive.

State and local governments are typically bound by balanced budget rules, so tax revenues generally match expenditures. The disincentive effects of taxes, and the corresponding reduction in private spending that they cause, are thus outweighed by the effects of public expenditures, effects which include both increased demand for private goods and services and the production of public goods such as education and infrastructure that sustain growth in the private sector.

On average, an increase in state and local value-added is followed by an equal increase in private sector production, doubling the impact on the economy. This effect is larger when the economy is in recession, and smaller when the economy nears full employment. Thus, in a recession the public and private sectors appear to be complements, not substitutes. Efforts to promote growth in a recession by cutting state and local expenditures to avoid tax increases are thus likely to backfire.