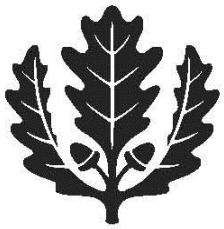

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Can State and Local Revenue and Expenditure Enhance Economic Growth? A Cross-State Panel Study of Fiscal Activity

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Can State and Local Revenue and Expenditure Enhance Economic Growth?

A Cross-State Panel Study of Fiscal Activity*

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Abstract

The slow economic recovery since the 2008 financial crisis and Great Recession requires state and local governments to continue to make difficult decisions concerning which taxes to raise and which expenditures to decrease in order to maintain a balanced budget. As expenditures usually raise economic growth and taxes generally hinder it, seeking the optimum combination of taxes and expenditures encourages prosperity in a state. In this paper, we study the effects of various expenditures and revenue combinations on growth in real state personal income per capita, using a sample of annual observations from 1977 to 2010 for 49 states and the District of Columbia. We find that state and local governments overfund education and parks, recreation, and natural resources while they underfund hospitals and health spending, once netted for charges and user fees. State and local governments also underutilize corporate income taxes as a source of revenue. Finally, we also estimate non-linear and short- and long-run specifications, which generally support prior findings.

JEL: E62, H21, H70, O40, R11

***Key Words*:** Regional growth, state and local finance

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1. Introduction

The slow economic recovery since the 2008 financial crisis and Great Recession requires state and local governments to continue to make difficult decisions concerning which taxes to raise and which expenditures to decrease in order to maintain a balanced budget. Taxation divorces the price the seller receives from the price the buyer pays and, thus, causes distortions in market activity and dead-weight losses in the economy. At the same time, the private economy underprovides public goods. Higher taxes provide a higher level of public expenditure, which may foster economic growth. This study considers how the fiscal decisions as to the types of taxes and expenditures at the state and local level can encourage prosperity in a state.[1]

This paper analyzes the relationship between fiscal structures, including specific taxes and specific spending categories, and growth in real per capita personal income, using annual data from 1977 to 2010. We investigate the effects of specific taxes and specific expenditures on state and local growth, adding to the literature by considering more disaggregation in the fiscal variables and by including data from the most recent fiscal crisis and Great Recession. The inclusion of all sources of revenue, expenditure, as well as the state and local government surplus, implies that perfect multicollinearity occurs. Thus, we must exclude one of the sources of revenue, expenditure, or the surplus to estimate our models. We then can interpret the coefficients as the effect on the growth rate of the economy from an increase in the independent variable caused by an appropriate offset of the omitted variable. For example, we can compare the effect of raising corporate taxes or lowering the surplus to fund higher education spending, and so on. We then do this, in turn, for all offset fiscal variables. Then we can answer the question of which fiscal revenues and expenditures the state and local government over- or

[1] Although this paper investigates how fiscal structure affects economic growth, other factors affect fiscal policy decisions besides enhancing economic growth. For example, the state and local governments provide public goods at the level that the public desires, which need not enhance growth.

under-uses for the average state.

We also estimate the short- and long-run effects, adopting the specification of Reed (2008). Using five-year intervals, we estimate a specification that includes both differenced variables (i.e., short-run effects) as well as lagged variables (i.e.., long-run effects). His specification brings added benefits of reducing measurement error and serial correlation.

Finally, Bania, Gray, and Stone (2007) note that focusing on linear incremental effects does not allow for decreasing returns to expenditure increases. That is, when an expenditure category (e.g., higher education) first increases, it provides additional public goods or services, probably enhancing economic growth. Once government sufficiently provides the privately under-provided public good or service, additional government expenditure will crowd out the private economy, and therefore reduce growth. We incorporate squared fiscal variables into our linear specification to estimate the possibility of these "growth hills."

We find that, on average, reducing state and local government revenue and expenditure enhances growth. Governments overfund education and transportation while they underfund police, fire and corrections; utilities, once netted for charges and user fees; and welfare, unemployment, housing, and community spending. When estimating the long-run effect, we discover more evidence that additional government spending diminishes growth. Furthermore, we observe that state and local government underutilizes corporate income taxes as a source of revenue. We find evidence in support of growth hills, estimating the "optimal level" of growth-enhancing government revenue to fall between 18 and 30 percent of the economy. Unproductive government expenditure does not enhance economic growth at any point.

The paper proceeds as follows. Section 2 discusses the relevant literature. Section 3 develops a theoretical framework that generates the specification to estimate the relationship

between tax and spending categories and the growth rate of state income. Section 4 discusses the data and estimation methodology. Section 5 reports and discusses the estimated results. Section 6 concludes.

2. Overview of Previous Research

The literature offers few conclusions as to the effects of taxes on economic growth. Most conclude that taxes used to fund transfer payments exert small, negative effects on economic activity. If used for productive purposes, oft times tax increases increase economic growth: Helms (1985); Phillips and Goss (1995); Miller and Russek (1997), Wasylenko (1997), and Bania, Gray, and Stone (2007). Other studies, however, show a negative effect on growth: Mullen and Williams (1994); Besci (1996); and Reed (2008). Even other studies show a weak effect of taxes on growth: Romans and Subrahmanyan (1979); Wasylenko and McGuire 1985); Stokey and Rebelo (1995); Lucas Jr. (1990); and Tomljanovich (2004). Most studies focus on the overall tax burden, they do not study in great detail separate taxes and spending categories.

Helms (1985) recognized the problem of interpreting the coefficient of fiscal variables, given the government budget constraint. That is, spending must equal revenues plus deficit. This allows him to separate the effect of overall taxation and expenditure into subcategories. Without including multiple expenditure options, researchers must interpret the effects on growth as the effect of raising a tax to finance average expenditures. Helm's approach allows the analysis of the different effects from raising a tax to finance, for example, transfer payments or education. Helms uses the natural logarithm of real state personal income as the dependent variable. The explanatory variables include both government revenue and expenditure. The revenue components include property taxes, other taxes, user fees, and federal source revenues. The expenditure components include health, highways, local schools, higher education, and other

expenditures. To avoid perfect multicollinearity, Helms omits transfer payments. He finds, for example, positive effects from raising public service expenditure financed by lowering transfer payments, and negative effects of raising taxes to increase transfer payments.

Mofidi and Stone (1990) study the effects of fiscal revenue and expenditure on investment and employment. Like Helms, they omit transfer payments and find that transfers exhibit a negative effect. Expenditures on health, education, and infrastructure exert positive effects. Expanding the decomposition of fiscal variables even further, Miller and Russek (1997), using fixed effects, investigate the effects of tax and expenditure components on state real GDP growth GDP from 1978 to 1992. They find that government overuses sales taxes and underuses corporate income taxes. They also report negative relationships between growth and education, transportation, and public safety.

Stokey and Rebelo (1995) show that under most circumstances, a consumption tax does not affect the return on capital and, thus, does not affect investment, output, and productivity. They also discover that higher property taxes lower the return on reproducible physical capital and on non-reproducible land. Therefore, increases in property tax rates that lower the return on capital will reduce growth.

Kneller, Bleaney, and Gemmell (1999) distinguish between distortionary taxes defined as taxes on income and property, and non-distortionary taxes defined a consumption taxes. They conclude that while the former reduces growth, the latter does not. Additionally, they find that productive government spending benefits growth. Similarly, Gemmell, Kneller, and Sanz (2006) use annual data and include short-run dynamics and confirm the findings of Kneller, Bleaney, and Gemmell (1999).

Widmalm (2001) discovers that the proportion of tax revenues raised from taxing

personal income negatively correlates with growth. Moreover, she documents a tendency for consumption taxes to enhance growth.

Brown, Hayes, and Taylor (2003) study the effects of taxes and expenditures for state and local governments across states for the years 1977 to 1997. Using a one-year lag structure for the fiscal variables, they find that state and local governments underutilize corporate taxes and over utilize sales and property taxes. They also find welfare spending to enhance growth if funded by corporate income taxes, but to diminish growth if funded by sales taxes. They also report that state and local governments overfund both elementary and higher education. Additionally, health and hospital spending diminish growth in state GDP, if funded by sales or property taxes. Transportation and housing both grow the economy, if income taxes fund them.

Yamarik (2000), using pooled OLS to estimate the effects of taxes on gross state product (GSP) from 1977 to 1995, reports that the average tax rate significantly, negatively affects the growth of GSP. Specifically he concludes that marginal personal income and average property taxes exhibit a negative relationship with growth. In a later paper, Ojede and Yamarik (2012) estimate long- and short-run relationships, using the pooled mean-group estimators, leaving out welfare expenditure. Their short-run findings include a negative effect on growth when increases in expenditures or property taxes are financed by a reduction in welfare payments. Raising the deficit to pay for welfare expenditures exhibits a positive effect on growth. In the long run, state and local expenditures generate a positive effect on growth, if raised by lowering welfare payments. Deficit, sales tax, and property tax financing of welfare payments all exhibit a negative effect on growth.

Recently, Reed (2008), in a thorough and robust study, examines growth across states from 1970 to 1999. Using five-year differences, he consistently finds a negative effect of the tax

burden on state economic growth. He estimates under different time periods, different geographical regions, and various estimation techniques. In imitating Helm's style, but contrary to his findings, Reed discovers that raising total taxes to fund non-welfare expenditure exerts a negative effect on growth both in the long and short run. Reed did not, however, distinguish between the types of taxes, or the types of non-welfare spending.

3. Theoretical Model

We adapt the Bania, Gray, and Stone (2007) and Bleaney, Gemmell, and Kneller (2001) presentation of the public-policy endogenous growth model from Barro and Sala-i-Martin (1992b). In the model, fiscal policy can determine both the level of the output path and the steady-state growth rate. This differs from the neoclassical growth model, which only allows for fiscal policy to affect the level of the output path. The production process involves, *n* producers, each producing output, *y.* That is,

$$y = Ak^{1-\alpha}[\sum_{i=1}^{k} g_i]^{\alpha}, \quad (1)$$

where *A* is a positive constant, *k* is private capital and $g_i \left(i = 1,...,k\right)$ is a group of publicly provided inputs, and α is a parameter between zero and one. State and local government funds its budget with a proportional tax on output at the rate $\tau_h \left(h = 1,...,l\right)$, a group of tax rates (sales, property, income, other). This leads to the following state and local government budget constraint:

$$n\sum_{i=1}^{k} g_i + \sum_{j=1}^{m} C_j + b = ny\sum_{h=1}^{l} \tau_h, \quad (2)$$

where $C_j \left(j = 1,...,m\right)$ is a group of government-provided consumption (or "non-productive") goods and *b* is the budget surplus. The representative, infinite-lived household's utility function is given as follows:

$$U = \int_0^{\infty} ((c^{1-\theta} - 1)/(1-\theta))e^{-\rho t}\, dt, \;\; \theta > 0, \tag{3}$$

where -θ is the marginal utility's constant elasticity, c is consumption per person, and ρ>0 is the constant rate of time preference. Households hold real assets, *a(t)*, with a real rate of return denoted by *r(t)*. The household's budget constraint determines saving (i.e., *da/dt*) or income minus consumption as follows:

$$da/dt = ra - c. \tag{4}$$

The first-order condition for maximizing utility subject to the budget constraint requires the following real rate of return:

$$r = \rho + \theta \cdot \kappa_c, \tag{5}$$

where κ_c is the growth rate of consumption per person.

Firms seek to maximize net revenues. Barro and Sala-i-Martin (1992b) show the first-order optimization condition includes the relationship

$$r = (1 - \sum_{i=1}^{k} \tau_i)(dy/dk)/\eta, \tag{6}$$

where dy/dk is the marginal product of capital and η is the constant cost of capital.

We calculate the constant growth rate of per capita consumption by combining equations (5) and (6) to give

$$\kappa_c = [\left(1 - \sum_{i=1}^{k} \tau_i\right)(dy/dk)\,/\eta - \rho]/\theta. \tag{7}$$

The growth rate of c equals the growth rate of y as long as the appropriate transversality conditions hold. Equation (1) determines the marginal product of capital as follows:

$$dy/dk = (1-\alpha)A\left([\sum_{i=1}^{k} g_i]/k\right)^{\alpha}, \tag{8}$$

which transforms into

$$dy/dk = (1-\alpha)A^{\frac{(1-\alpha)}{(1-\alpha)}}[\sum_{i=1}^{k} g_i]^{\frac{\alpha(1-\alpha)}{(1-\alpha)}} k^{-\alpha}. \tag{9}$$

Eventually, the equation reduces to

$$dy/dk = (1-\alpha)A^{\frac{1}{1-\alpha}}([\sum_{i=1}^{k} g_i]/y)^{\frac{\alpha}{1-\alpha}}. \quad (10)$$

Finally, plugging this result into equation (7), we determine the growth rate of the economy, V, as follows:

$$V = w\left(1-\sum_{h=1}^{l}\tau_h\right)(1-\alpha)A^{1/(1-\alpha)}\left([\sum_{i=1}^{k} g_i]/y\right)^{\alpha/(1-\alpha)} - m, \quad (11)$$

where $w = 1/\theta$ and $m = \rho/\theta$. The model determines private capital endogenously and, therefore, private capital does not appear in equation (11). Output growth in the steady state depends only on structural parameters for production and utility (*w*, *m*, α, and *A*), the tax rates (τ_h) and the ratio of productive government expenditures to output, ($[\sum_{i=1}^{k} g_i]/y$).

For empirical testing, suppose that the growth rate, V_{st}, at time *t* in state *s* depends on the fiscal variables from equation (2), X_{ist}, state fixed effects (which control for time-invariant characteristics such as geography, natural amenities, distance from markets, and time-invariant government regulation), φ_s, time fixed effects (which control for macroeconomic forces and federal government activity), γ_t, and three state control variables – lagged real per capita personal income, y_{st-1}, the population growth rate, n_{st}, and the unemployment rate, u_{st}. That is,

$$V_{st} = \beta_0 + \beta_1 y_{st-1} + \sum_{i=1}^{k} B_i X_{ist} + \beta_2 n_{st} + \beta_3 u_{st} + \varphi_s + \gamma_t + \omega_{st}, \quad (12)$$

where β_0, β_1, β_2, β_3, and the vector B_i are parameters to be estimated. In practice, this equation is similar to the reduced form equation found in Miller and Russek (1997) and Brown, et al. (2003).

The linear budget constraint in (2) indicates that

$$X_{kst} = -\sum_{i=1}^{k-1} X_{ist}. \quad (13)$$

Hence, we must omit one fiscal variable to prevent perfect multicollinearity. Equation (12) then becomes,

$$V_{st} = \beta_0 + \beta_1 y_{st-1} + \sum_{i=1}^{k-1}(B_i - B_k)X_{ist}$$
$$+\beta_2 n_{st} + \beta_3 u_{st} + \varphi_s + \gamma_t + \omega_{st}. \quad (14)$$

That is, the fiscal coefficients measure the effect of a unit change in the variable offset by the corresponding change in the omitted variable from the regression. For example, if we omit corporate income taxes, then the coefficient for welfare, unemployment, and housing measure the expected increase in the growth rate due to a one unit increase in welfare, unemployment, and housing spending funded by an increase in the corporate income tax.

4. Data

Personal income for each state and the District of Columbia, population, and fiscal variables for each state come from U.S. Department of Commerce, Bureau of the Census' *Government Finances* database. Unemployment rates for each state come from the U.S. Department of Labor, Bureau of Labor Statistics. We compute real per capita personal income using the national GDP deflator, since a consistent state level price index does not exist over our sample period.

The Census did not collect data for local finances and consequently state and local finances for the years 2001 and 2003. It did, however, collect state data for these two years. Using these data, we interpolate the state and local fiscal variables by estimating the following equation,

$$S\&L_{st} = \sigma_0 + \sigma_1 State_{st} + \sigma_2 u_{st} + \sigma_3 t + \sigma_4 t^2 + \varphi_s + e_{st}. \quad (15)$$

where $S\&L_{st}$ denotes a state and local fiscal variable, $State_{st}$ denotes the comparable state fiscal variable, u_{st} is the unemployment rate, t is time, φ_s are state fixed-effects, e_{st} is the error term, and the elements of the vector σ are parameters to be estimated. We then include the predicted

values of for the S & L_{st} variables for the years 2001 and 2003 in the original series.[2]

We approximate the dependent variable as $V_{st} = \ln(y_{st}) - \ln(y_{st-1})$, where y_{st} is real per capita personal income. The use of a per capita measure of output matches the work of Miller and Russek (1997), Yamarik (2000), Bleaney, Gemmell, and Kneller (2001), Bania, Gray and Stone (2007), and Reed (2008). Dividing personal income by population allows the coefficients to measure the effect of differences in growth over and above population increases, and real personal income per capita measures the standard of living or quality of life.

We examine the fiscal variables both at the aggregate and disaggregated levels. The aggregate variables include total revenue, total expenditure, net intergovernmental revenue (intergovernmental revenue minus intergovernmental expenditure), and surplus. Net intergovernmental revenue captures the net federal taxes brought back to the state. The disaggregated revenue variables include property taxes, sales taxes (which includes sale of property, but excludes the public utility sales tax), individual income tax, corporate income tax, and other revenues. The expenditure variables include police, fire, and correction facilities; transportation; higher education; secondary education; hospitals and health; parks, recreation, and natural resources; welfare, housing and community, and unemployment expenditures; and other expenditures. Finally, we also include net utility expenditures.[3] *Government Finance* categorizes public transit spending in the total utilities. We move these expenditures to the transportation section. We also include solid waste and sewerage services, which are self-classified, in total utilities expenditure.

Because we address the issue of the effects of tax distortion, we net out revenue charges

[2] We conduct the regression using level variables rather than natural logarithms because a few of the variables include negative values

[3] Positive net expenditure on utilities occurs for 65% of the observations.

and fees. For example, parks and recreation charges include revenues gathered from the use of facilities operated by the government (swimming pools, community recreation centers, museums, and so on) (see the U.S. Bureau of the Census 2006). These revenue streams are not distortionary.[4] Therefore, in evaluating the effect of tax revenue to supply public services, we remove the corresponding charges from the expenditure. Different revenue sources cover the remaining portion of the expenditure not financed by charges and fees. The charges and fees recorded by the Census include air transportation, highways, water transportation, parking, education, hospital, parks and recreation, natural resources, housing and community, and other charges. In addition, we subtract utility revenues and liquor store revenues from their respective expenditures. Brown, Hayes, and Taylor (2003) incorporate net utilities and subtract tuition from education, but they do not do this for all applicable variables. They also include total charges and tuition as separate revenue variables. This specification allows tuition to fund other expenditures. In reality, if the state did not provide education, it would not collect tuition revenue. Our approach of netting charges from expenditure provides a differentiation from the existing literature. The Appendix provides more information on fiscal variable series.

We divide the fiscal variables by state personal income and multiply by 100, giving an "effective average tax rates" in a state (Helms, 1985). Table 1 reports descriptive statistics for each variable.

The growth rate averaged 1.94%, ranging from -14.54% (Wyoming in 2009) to 17.64% (North Dakota in 1981). The unemployment rate averaged 6.61%. Total revenue averaged 18.23% of state personal income. Tennessee experienced the minimum (10.08% in 2009) and Wyoming experienced the maximum (43.62% in 2001). Total expenditure ranges from 10.71%

[4] Here, we must assume that the charge or fee equals the marginal cost of providing the good or service.

(North Dakota in 1985) to 32.38% (D.C. in 1977), averaging 17.46%. Sales taxes provide the largest source of revenue (3.54%) with property taxes a close second (3.11%). Secondary education receives the largest spending (4.27%). Welfare, unemployment compensation, and housing and community expenditure comes in second (3.36%). Table A1 and A2 report the means by state for revenue and expenditure, respectively.

Pre- and post-financial crisis

The Great Recession began with the financial crisis in the autumn of 2008. Table 2 reports the difference in government fiscal activity from before and after the crisis. The Census Classification Manual defines a year as follows: "each individual government fiscal year that ended between July 1 of the previous year and June 30 of the survey year." Table 2 lists the average descriptive statistics for 2007 and 2008 as well as 2009 and 2010.

The mean growth rate of real per capita personal income completely reverses from 2.05% to -2.30%. The unemployment rate doubles from 4.93% to 8.84%. Revenues decrease from 19.41% of personal income to 16.30%. At the same time, expenditures increase from 18.38% to 20.60%. This results in the surplus dropping from 5.48% of state personal income to just 1.11%. Interestingly, for a recession starting with the bursting of a housing bubble, property taxes rise from 3.09% to 3.41%, indicating that total property tax revenue fell less than state personal income. Sales taxes remain mostly unchanged, while the income taxes decrease modestly.

On the expenditure side, net utilities remain constant as a share of personal income. Police, fire, and correction facilities; transportation; education; and parks, recreation, and natural resources increase modestly. Health and hospital decrease 76% from a share of 0.84% to 0.20%. Welfare, unemployment compensation, and housing and community spending increase dramatically from 3.98% to 5.04%.

Estimation

The theoretical model suggests that some revenues and expenditures are distortionary while others are not. Rather than judging a priori the nature of each variable, we omit each variable, in turn. Because of collinearity, each of these regressions is, in essence, the same regression.

The study covers 1977 to 2010 over 49 states[5] and the District of Columbia, implying 1700 observations in the panel data set. The data for the personal income includes 1976. Because the personal income data run over the calendar year, and the budget data run over the fiscal year, an implied six month lag exists in the regressions. We estimate each specification using the two-way fixed-effect model with robust panel-corrected standard errors. First, we estimate the equation including aggregated fiscal variables to test the level of overall expenditure and revenue. Next, we estimate the equation with disaggregated fiscal variables. Then, we estimate the specification that captures short- and long-run effects using aggregated and disaggregated fiscal variables. Lastly, we estimate the specification with growth hills using only aggregated fiscal variables.

The specification for growth hills is as follows:

$$V_{st} = \beta_0 + \beta_1 y_{st-1} + \sum_{i=1}^{k}(B_i X_{ist} + S_i X_{ist}^2) + \beta_2 n_{st} + \beta_3 u_{st} + \varphi_s + \gamma_t + \omega_{st}. \quad (16)$$

Once again, we leave out each fiscal variable, in turn, for each regression. Since the squared terms of net intergovernmental revenue and surplus are insignificant and the point estimate close to zero, we omit them in the regression.

5. Results

Table 3 presents the results from the aggregated estimation. Two of the three state control

[5] We omit Alaska due to the extreme nature of their government's fiscal behavior, most of which reflects the pipeline built in 1977.

variables exert significant effects. First, the lagged real personal income per capita produces a significant negative effect on the growth rate of real personal income per capita at the 1-percent level. This result conforms to the β-convergence hypothesis at the state and local level (e.g., see Barro and Sala-i-Martin 1992a). Second, the unemployment rate causes a significant negative effect on the growth rate at the 1-percent level, the expected finding. For each additional percentage rise in the unemployment rate, growth is expected to slow by -0.30%. Finally, the population growth rate, although negative, does not generate a significant effect on the growth rate.

Higher total revenue and higher total expenditure generally generate significant negative effects on the growth rate. The exception occurs when revenue is raised to increase the surplus. This particular fiscal action causes a significant increase in the growth rate. This indicates that state and local governments raise too much revenue and spend too much, on average. From theory, this would indicate that the average state spends too much on unproductive expenditures. Miller and Russek (1997) suggest another possibility. To wit, total expenditure and total revenue exhibit less cyclical volatility than personal income, implying that cyclical effects may cause the negative correlation. Finally, we note that raising the fiscal surplus either by raising revenue or by reducing spending significantly increases the growth rate. Three additional comments provide some caution about our findings. First, we only consider the effect of fiscal variables on the economic growth rate in per capita real personal income, and not the public's demand for public good provision. Second, these results only inform us in a broad sense. That is, they do not provide information on which particular type of government spending diminishes growth. Third, the current specification focuses on short-run effects of fiscal variables. A latter specification provides some evidence on both the short- and long-run effects of changes in fiscal structure.

The coefficients in Tables 3 as well as in Tables 4, 5, and 6 are symmetric. For example, in the first column of Table 3, when a state raises total expenditure by one percent of state personal income, it must do so by raising total revenue and the growth rate of the economy decreases by -0.33 percent, on average. In the second column, when a state increases revenue by one percent of state personal income, again, it must do so only by raising total expenditure and again the growth rate changes by -0.33 percent. These two specifications measure the same event and yield the same coefficient. When considering two revenue or two expenditure variables, the coefficients exhibit the same magnitude, but the opposite sign. When considering one revenue variable and one expenditure variable, the magnitudes of the coefficient remain the same but the sign remains the same.

Table 4 displays the disaggregated results. Again, two of the three state control variables exhibit significant effects. As before both the lagged real personal income per capita and the unemployment rate each exert a significant negative effect on the growth rate and the population growth rate does not exhibit a significant effect, although, once again, the coefficient is negative.

Transportation and higher education expenditures both exhibit a consistent significant negative effect on economic growth at the 1-, 5-, or 10-percent levels. For both expenditure variables, 13 out 15 coefficients possess significant effects on growth in state personal income. Funding it by any source of revenue uniformly yields a negative effect. No significant effect emerges when each of these two expenditures provides the funding source for the other expenditure as well as when the funding source in parks, recreation, and natural resource expenditure. The negative effect consistently proves higher and/or more significant for higher education expenditure. For higher education expenditure, the significant decreases on the growth rate range from a low magnitude of -1.38% (secondary education) to a high magnitude of -2.37%

(corporate income tax). The significant coefficients for transportation expenditure all fall around -1.00%. Secondary education expenditure produces 8 significant negative coefficients as well as significant positive coefficients, if the funding of secondary education comes from transportation and/or higher education spending. Increasing spending on parks, recreation, and natural resources produces negative effects on the growth rate, although the coefficients only occasionally prove significant at the 10-percent level.

Fiscal spending for net utilities; police, fire, and correction facilities; health and hospitals; welfare, unemployment, housing, and communities sometimes generate significantly positive effects on the growth rate. At no time do the estimated coefficients for these spending variables indicate a significant negative effect. For health and hospitals, the significant positive effects occur only for reductions in transportation and higher education expenditure. For net utilities; police, fire, and correction facilities; and welfare, unemployment, housing, and communities spending, other sources of financing that produce significant positive effects on the growth rate, in addition to reduced transportation and higher education spending, come from increased individual income tax revenue, and reduced secondary education and parks, recreation, and environmental spending.

The evidence suggests that states overfund transportation and education for the average state.[6] For education funding, this finding agrees with those of Brown, et al. (2003) and Miller and Russek (1997), but contradicts those of Mofidi and Stone (1990) and Helms (1985). This may reflect a lack of correlation between the quality of education and the money spent on education. Furthermore, Miller and Russek (1997) suggest that it may reflect a disincentive for states to invest in human capital. "Better to let someone else exhaust resources on education and

[6] To test the hypothesis that states "built" too many buildings for education, we also performed the analysis using education minus capital outlays. The coefficients for higher education became slightly less negative, while the coefficients for secondary education became slightly more negative.

then hire the improved product away." Because transportation and education spending may not affect growth in real personal income per capita in the short run, we consider the short- and long-run effects of transportation and education spending later in this paper.

Increasing the budget surplus indicates a benefit to growth in state real per capita personal income. The coefficients for surplus range from 0.20% (net intergovernmental revenue) to 2.25% (higher education). Increasing the individual income taxes produces significant positive effects on the growth rate when some other taxes decrease (property, sales, other, and intergovernmental revenue) as well as when other expenditures increase (net utility and welfare, unemployment, housing and community spending). An increase in the individual income tax produces a negative effect on the growth rate for increasing transportation and higher education spending. Increasing the property or sales tax revenue to finance transportation and higher education spending also generates a significant negative effect on economic growth.

The evidence suggests that states rely too little on the individual income tax and too heavily on property and sales taxes.

Long-Run Effects and Measurement Error

Annual data are particularly vulnerable to measurement error bias. Reed and Rogers (2006) estimate the roughly one-half of the annual variation in tax burden reflects factors other than tax policy. Evans and Karras (1994) characterize annual state-level income data as containing substantial serial correlation. To partly address these problems and following Reed (2008), we use multi-year interval data. Measurement errors more likely cancel over longer time periods and serial correlation becomes less severe when observations stand further apart in the time dimension. An additional advantage comes from the fact that the states use different calendar dates for their fiscal years. Since the state control variables and real personal income per capita

use the calendar year, extending the lag back in time ameliorates this timing issue.

In sum, as a further robustness check and to consider longer-term relationships between revenue, expenditure, and growth, we estimate the regression using 5 year intervals and incorporating a 5 year lag into the fiscal variables. Consistent with Reed (2008), the data now include observations for the years 1977-1981, 1982-1986, … , 2002-2006, for 300 observations. The estimated equation becomes as follows:

$$V_{st} = \beta_0 + \beta_1 y_{st-1} + \sum_{i=1}^{k}[D_i(X_{ist} - X_{ist-4}) + L_i X_{ist-4}] + \beta_2 n_{st} + \beta_3 u_{st} + \varphi_s + \gamma_t + \omega_{st}. \quad (16)$$

Another mathematically equivalent specification of the fiscal variables is

$$\sum_{i=1}^{k}[D_i X_{ist} + (L_i - D_i)X_{t-4}]. \quad (17)$$

Table 5 reports the results for the aggregate fiscal variables. Lagged real personal income per capita and the unemployment rate prove significantly negative at the 1-percent level. Now, however, the population growth rate exerts a significantly negative effect on economic growth at the 5-percent level.

The estimated coefficients for the fiscal variables continue to tell a similar story as those found in Table 3. The short-run effects captured by the change in the fiscal variable over the 5-year interval show the same signs and same significance. The exception is intergovernmental revenue, which no longer proves significant. as those results reported in Table 3. Moreover, the coefficients in Table 5 uniformly exceed those in Table 3.

The long-run effects captured by the 5-year lagged levels of the series provide some significant findings. The positive effect of financing an increase in the fiscal surplus with higher revenue or lower spending continues in the long run, albeit with smaller coefficients than for the short run: 0.30 rather than 0.63 for increasing revenue and 0.42 rather than 1.02 for decreasing

spending. The short-run significant negative effect of raising revenue by increasing spending or increasing spending by raising revenue of -0.39% disappears in the long run, That is, the long-run effect equals -0.12%, but proves insignificant.

Table 6 displays the estimates the long-run effects of disaggregated revenues and expenditures. Recall that because of perfect multicollinearity, each regression is the same. Since there are only 300 observations, in contrast to the 1700 observation before, there are less statistically significant relationships. In general, the coefficients are larger. This could illustrate the lag in the effect that fiscal activity has on economic growth. It could also reflect correction for the biases mentioned previously.

The most influential fiscal variables from the analysis displayed in Table 4, transportation, higher education, and secondary education expenditures, see a largely smaller role in terms of significant coefficients and a much less influential variable, parks, recreation, and natural resource expenditure, plays a much more prominent role in terms of significant coefficients. Consider parks, recreation, and natural resource expenditure. In the long run, 15 of the 16 coefficients prove significantly negative whereas in the short run, 14 of 16 coefficients prove significantly negative. Transportation, higher education, and secondary education expenditures see fewer significantly negative coefficient estimates. The significantly negative coefficients for higher education generally point to long-run effects whereas for secondary education generally point to short-run effects. Transportation expenditure does not show a pattern for long-and short-run coefficients that are significantly negative.

The fiscal surplus shows a pattern in that all significant coefficients are positive, indicating that growing the surplus leads to economic growth. These effects come in both the short- and long-run. The individual income tax generally shows positive coefficients when they

are significant. Moreover, most of the significant positive coefficients appear in the long-run and not the short run. The sales tax coefficients when significant are generally negative. Moreover, the sales tax predominantly exerts its negative effect in the short run and not the long run.

The corporate income tax now exhibits a few significant positive coefficients. These occur in the short run.

Growth Hills

In an effort to explain the variety of econometric results for the effect of taxation on economic growth among the literature, Bania, Gray, and Stone (2007) argue that all findings could accurately reflect outcomes in Barro-style growth models. That is, in such models, taxes can exert negative, no, or positive effects on growth. The effects rely on the initial level of taxes and what the tax revenues fund. For relatively low taxes, revenue increases spent on productive expenditure will exhibit a positive effect on growth. For relatively high taxes, this effect may turn negative.

The theory differentiates between productive and nonproductive expenditures in their effect on economic growth. Rather than judging *a priori* what constitutes productive and nonproductive expenditures, we incorporate the findings from Tables 4 and 6, defining nonproductive expenditure as parks, recreation, and natural resources; higher education; secondary education; welfare, unemployment, and housing and community; and transportation and defining productive expenditure as hospital; net utility; police, fire, and corrections facilities; and other expenditures. Table 7 displays the results. From the results, we estimate the peak of a growth hill for total revenue, where $Total\ Revenue = -B_1/2S_1$. For the four equations the estimated growth maximizing share of revenue to personal income are respectively: 17.86, -0.21, 21.29, and 30.30. Revenue that funds nonproductive expenditure diminishes growth at any point

for the states in the time period in the sample. Increasing nonproductive expenditures decreases growth at an increasing rate.. The other three estimates give an estimate as to the ideal revenue to personal income ratio. The higher point estimate for revenue funding surplus, suggests the negative effect that state budget deficits impose on the state economy.

6. Conclusion

This paper examines the effect of state and local revenues and expenditures on growth in real per capita personal income across 49 states and the District of Columbia using a sample from 1977 to 2010. We investigate the issue under the framework of a constant government budget constraint: revenues equal expenditures plus surplus.

Policy makers consider more goals than simply to grow state personal income. Certain desirable aspects in policy makers' objective functions do not reflect the level of real personal income per capita. Therefore, our findings abstract from other goals besides the growth rate of real personal income per capita. Readers need to keep this fact in mind when reviewing our findings.

We find that state and local government collect too much revenue. If revenues increase by one percent as a share of personal income to finance a similar increase in general expenditure, the growth rate of the economy shrinks by -0.33%. The same outcome occurs from increasing general spending by one percent and financing this with the same increase in revenue.

We then disaggregate revenue and spending into subcategories to reinvestigate the question. In our basic model, we find that transportation, higher education, and secondary education spending generally reduces economic growth. At the same time, parks, recreation, and natural resource spending does not exert many significant effects on economic growth, although the signs and magnitudes of the coefficients seem comparable to the signs and magnitudes of

coefficients on transportation, higher education, and secondary education spending. The coefficients generally prove insignificant in a statistical sense. When we specify the model to consider both short-run and long-run effects, the results reverse themselves somewhat between these four variables. Now, parks, recreation, and natural resource spending exhibits many significantly negative coefficients in both the short and long run. The number of significantly negative coefficients for transportation, higher education, and secondary education spending falls, although many significant coefficients still exist. For higher education spending, now the significantly negative coefficients tend to fall in the long run effects whereas the secondary education spending possesses significant negative coefficients in the short run. Agreeing with the later literature Brown, et al. (2003) and Miller and Russek (1997), we find that government overfunds education spending for the average state.

State and local governments underutilize the corporate income tax. Relying more on a corporate income tax reduces market distortions caused by property taxes, individual income taxes, sales taxes, and federal tax sources. Increases in growth occur when some other taxes decrease (property, sales, other, and intergovernmental revenue) as well as when other expenditures increase (net utility and welfare, unemployment, housing and community spending).

Starting at zero, increasing revenue to fund productive expenditure, the surplus, or replace net intergovernmental revenue increases growth. Eventually, the growth rate starts to decrease as diminishing returns set in. For spending on these growth enhancing expenditures, we estimate that the optimal points lie between 17.86 and 30.30. The average level of spending for the sample falls in this range at 18.23 percent of total state personal income. Yet, recall that this includes spending on productive as well as unproductive expenditure.

Government taxation and expenditure should provide public goods that the private economy underprovides with minimal tax distortion. As state and local government move from overprovided expenditures to more underprovided expenditures and implement optimal taxation, state economies will grow at higher rates.

Table 1: Summary Statistics: 1977-2010

Variable	Mean	Std. Dev.	Min	Max
Growth Rate of Real Personal Income per Capita	1.94	2.61	-14.54	17.64
Lagged Real Personal Income per Capita	3.29	0.26	2.63	4.18
Unemployment Rate	6.61	2.19	2.30	19.30
Population Growth Rate	1.01	1.08	-5.99	7.32
Total Revenue	18.23	3.56	10.08	43.62
Total Expenditure	17.46	3.16	10.71	32.38
Net Intergovernmental Revenue	4.08	1.64	1.77	17.86
Surplus	4.86	2.74	-3.43	28.70
Property Tax	3.11	1.10	0.97	8.42
Sales Tax	3.54	1.14	0.70	7.47
Individual Income Tax	2.03	1.15	0.00	4.93
Corporate Income Tax	0.41	0.24	0.00	1.36
Other Revenue	9.15	3.09	1.84	36.08
Net Utility Expenditure	0.13	0.42	-0.64	5.50
Police, Fire, & Correction Facilities	1.34	0.45	0.62	4.92
Transportation	1.78	0.79	-0.64	11.07
Higher Education	1.08	0.38	0.16	2.74
Secondary Education	4.27	0.69	2.56	8.65
Health & Hospital	0.79	0.33	-0.21	2.78
Parks, Recreation, & Natural Resources	0.51	0.23	0.13	1.70
Welfare, Unemployment, Housing & Community	3.36	1.23	0.94	8.82
Other Expenditure	4.20	1.10	1.58	9.57

Note: Appendix 1 provides the description of the fiscal variables. We deflate all fiscal variables by personal income and multiply the result by 100. We also express growth rates as percentages. Finally, we take the natural logarithm of lagged real personal income per capita.

Table 2: Summary Statistics: Before and After Start of Great Recession

Variable	2007-2008		2009-2010	
	Mean	Std. Dev.	Mean	Std. Dev.
Growth Rate of Real Personal Income per Capita	2.05	1.92	-2.30	4.28
Lagged Real Personal Income per Capita	3.59	0.16	3.55	0.16
Unemployment Rate	4.93	1.07	8.84	2.12
Population Growth Rate	0.99	0.74	0.85	0.56
Total Revenue	19.41	3.85	16.30	3.08
Total Expenditure	18.38	2.57	20.60	2.80
Net Intergov't. Revenue	4.45	1.62	5.42	1.66
Surplus	5.48	3.56	1.11	2.63
Property Tax	3.09	0.98	3.41	1.06
Sales Tax	3.54	1.18	3.45	1.08
Individual Income Tax	2.30	1.19	2.06	1.10
Corporate Income Tax	0.44	0.27	0.32	0.21
Other Revenue	10.04	3.58	7.05	2.81
Net Utility Expenditure	0.06	0.29	0.05	0.22
Police, Fire, & Correction Facilities	1.50	0.32	1.63	0.38
Transportation	1.61	0.49	1.78	0.60
Higher Education	1.07	0.40	1.15	0.48
Secondary Education	4.43	0.53	4.73	0.62
Health & Hospital	0.84	0.30	0.20	0.18
Parks, Recreation, & Natural Resources	0.51	0.26	0.53	0.27
Welfare, Unemployment, Housing & Community	3.98	1.09	5.04	1.19
Other Expenditure	4.38	0.93	5.49	1.10

Note: See Table 1.

Table 3: The Effect of Aggregate Expenditure and Revenue on State Economic Growth 1977-2010

Variable	Total Revenue	Total Expenditure	Net Intergov't. Revenue	Surplus
Lagged Real Per. Inc. Per Cap.	-2.30*	-2.30*	-2.30*	-2.30*
Unemployment Rate	-0.30*	-0.30*	-0.30*	-0.30*
Population Growth Rate	-0.10	-0.10	-0.10	-0.10
Total Revenue		-0.33*	0.13	0.29*
Total Expenditure	-0.33*		-0.46*	-0.62*
Net Intergovernmental Revenue	-0.13	-0.46*		0.16
Surplus	0.29*	0.62*	0.16	
Constant	16.35*	16.35*	16.35*	16.35*

Note: The omitted fiscal variable is noted by the column heading. ǂ p<0.1; ** p<0.05; * p<0.01.

Table 4: Effects of Disaggregated Revenue and Expenditure on State Economic Growth 1977-2010

Variable	Property Tax	Sales Tax	Individual Income Tax	Corporate Income Tax	Other Revenue	Net Utility Exp.	Police, Fire, & Correct. Facilities	Transport. Exp.
Lag Real Person. Inc. Per Capita	-4.67*	-4.67*	-4.67*	-4.67*	-4.67*	-4.67*	-4.67*	-4.67*
Unemployment Rate	-0.37*	-0.37*	-0.37*	-0.37*	-0.37*	-0.37*	-0.37*	-0.37*
Population Growth Rate	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Property Tax		0.23	-0.59*	0.27	-0.14	0.19	0.06	-1.20*
Sales Tax	-0.23		-0.83**	0.04	-0.37	-0.05	-0.17	-1.43*
Individual Income Tax	0.59*	0.83**		0.86	0.46*	0.78**	0.66	-0.61**
Corporate Income Tax	-0.27	-0.04	-0.86		-0.40	-0.08	-0.21	-1.47ǂ
Other Revenue	0.14	0.37	-0.46*	0.40		0.32	0.20	-1.06*
Net Utility Expenditure	0.19	-0.05	0.78**	-0.08	0.32		0.12	1.38*
Police, Fire, & Correct. Facilities	0.06	-0.17	0.66	-0.21	0.20	-0.12		1.26**
Transportation Expenditure	-1.20*	-1.43*	-0.61**	-1.47ǂ	-1.06*	-1.38*	-1.26**	
Higher Education Expenditure	-2.10*	-2.34*	-1.51*	-2.37*	-1.97*	-2.29*	-2.17**	-0.90
Secondary Education Expenditure	-0.72*	-0.96*	-0.13	-0.99	-0.59**	-0.91*	-0.79ǂ	0.47ǂ
Health & Hospital Expenditure	-0.25	-0.48	0.35	-0.52	-0.11	-0.43	-0.31	0.95**
Parks, Rec., & Natural Res. Exp.	-1.67	-1.90ǂ	-1.07	-1.93	-1.53	-1.85ǂ	-1.73ǂ	-0.47
Wel., Unem., Hous., & Comm. Exp.	-0.01	-0.25	0.58*	-0.28	0.12	-0.20	-0.08	1.18*
Other Expenditure	-0.38	-0.61	0.22	-0.65	-0.24	-0.56	-0.44	0.82**
Net Intergovernmental Revenue	0.05	0.28	-0.54*	0.32	-0.09	0.24	0.11	-1.15*
Surplus	0.15	-0.08	0.74*	-0.12	0.29*	-0.04	0.09	1.35*
Constant	27.33*	27.33*	27.33*	27.33*	27.33*	27.33*	27.33*	27.33*

Note: The omitted fiscal variable is noted by the column heading. ǂ p<0.1; ** p<0.05; * p<0.01.

Table 4: Effects of Disaggregated Revenue and Expenditure on State Economic Growth 1977-2010 (continued)

Variable	Higher Educ. Exp.	Second. Educ. Exp.	Health & Hosp. Exp.	Parks, Rec., & Nat. Res. Exp	Wel., Unem., Hous., & Comm. Exp.	Other Exp.	Net Intergov't. Revenue	Surplus
Lag Real Personal Inc. Per Capita	-4.67*	-4.67*	-4.67*	-4.67*	-4.67*	-4.67*	-4.67*	-4.67*
Unemployment Rate	-0.37*	-0.37*	-0.37*	-0.37*	-0.37*	-0.37*	-0.37*	-0.37*
Population Growth Rate	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Property Tax	-2.10*	-0.72*	-0.25	-1.67	-0.01	-0.38	-0.05	0.15
Sales Tax	-2.34*	-0.96*	-0.48	-1.90ǂ	-0.25	-0.61	-0.28	-0.08
Individual Income Tax	-1.51*	-0.13	0.35	-1.07	0.58*	0.22	0.54*	0.74*
Corporate Income Tax	-2.37*	-0.99	-0.52	-1.93	-0.28	-0.65	-0.32	-0.12
Other Revenue	-1.97*	-0.59**	-0.11	-1.53	0.12	-0.24	0.09	0.29*
Net Utility Expenditure	2.29*	0.91*	0.43	1.85ǂ	0.20	0.56	0.24	0.04
Police, Fire, & Correct. Facilities	2.17**	0.79ǂ	0.31	1.73ǂ	0.08	0.44	0.11	-0.09
Transportation Expenditure	0.90	-0.47ǂ	-0.95**	0.47	-1.18*	-0.82**	-1.15*	-1.35*
Higher Education Expenditure		-1.38**	-1.86*	-0.44	-2.09*	-1.73*	-2.05*	-2.25*
Secondary Education Expenditure	1.38**		-0.48	0.94	-0.71**	-0.35	-0.67*	-0.87*
Health & Hospital Expenditure	1.86*	0.48		1.42	-0.23	0.13	-0.20	-0.40
Parks, Rec., & Natural Res. Exp.	0.44	-0.94	-1.42		-1.65	-1.29	-1.62	-1.82
Wel., Unem., Hous., & Comm. Exp.	2.09*	0.71**	0.23	1.65		0.36ǂ	0.04	-0.16
Other Expenditure	1.73*	0.35	-0.13	1.29	-0.36ǂ		-0.33	-0.53*
Net Intergovernmental Revenue	-2.05*	-0.67*	-0.20	-1.62	0.04	-0.33		0.20**
Surplus	2.25*	0.87*	0.40	1.82	0.16	0.53*	0.20**	
Constant	27.33*	27.33*	27.33*	27.33*	27.33*	27.33*	27.33*	27.33*

Note: The omitted fiscal variable is noted by the column heading. ǂ p<0.1; ** p<0.05; * p<0.01.

Table 5: Long-Run and Short-Run Effects of Aggregated Revenues and Expenditures on Growth 1977-2010

Variable	Total Revenues	Total Expenditure	Net Intergov't. Revenue	Surplus
Lag Real Per. Inc. Per Capita	-4.65*	-4.65*	-4.65*	-4.65*
Unemployment Rate	-0.72*	-0.72*	-0.72*	-0.72*
Population Growth Rate	-0.46**	-0.46**	-0.46**	-0.46**
Δ Total Revenue		-0.39*	0.60	0.63*
Lag Total Revenue		-0.12	0.65ǂ	0.30ǂ
Δ Total Expenditure	-0.39*		-0.99	-1.02*
Lag Total Expenditure	-0.12		-0.77**	-0.42**
Δ Net Intergov't. Revenue	-0.60	-0.99		0.04
Lag Net Intergov't. Revenue	-0.65ǂ	-0.77**		-0.35
Δ Surplus	0.63*	1.02*	0.04	
Lag Surplus	0.30ǂ	0.42**	-0.35	
Constant	25.42*	25.42*	25.42*	25.42*

Note: The omitted fiscal variable is noted by the column heading. ǂ p<0.1; ** p<0.05; * p<0.01.

Table 6: Long-Run and Short-Run Effects of Disaggregated Revenues and Expenditures on Growth 1977-2010

Variable	Property Tax	Sales Tax	Individual Income Tax	Corporate Income Tax	Other Revenue	Net Utility Exp.	Police, Fire, & Correct. Facilities	Transport. Exp.
Lag Real Person. Inc. Per Capita	-6.89*	-6.89*	-6.89*	-6.89*	-6.89*	-6.89*	-6.89*	-6.89*
Unemployment Rate	-0.76*	-0.76*	-0.76*	-0.76*	-0.76*	-0.76*	-0.76*	-0.76*
Population Growth Rate	-0.56**	-0.56**	-0.56**	-0.56**	-0.56**	-0.56**	-0.56**	-0.56**
Δ Property Tax		0.49	-0.06	-1.71	-0.65	0.76	-1.66ǂ	-1.18
Lagged Property Tax.		0.43	-1.13ǂ	-0.36	-0.23	0.91	0.75	-0.81
Δ Sales Tax	-0.49		-0.56	-2.20ǂ	-1.15ǂ	0.26	-2.15*	-1.67ǂ
Lagged Sales Tax	-0.43		-1.56ǂ	-0.79	-0.65	0.48	0.32	-1.23
Δ Individual Income Tax	0.06	0.56		-1.64	-0.59	0.82	-1.59	-1.11
Lagged Individual Income Tax	1.13ǂ	1.56ǂ		0.78	0.91	2.04**	1.88	0.33
Δ Corporate Income Tax	1.71	2.20ǂ	1.64		1.05	2.46**	0.05	0.53
Lagged Corporate Income Tax	0.36	0.79	-0.78		0.13	1.27	1.11	-0.45
Δ Other Revenue	0.65	1.15ǂ	0.59	-1.05		1.41ǂ	-1.01	-0.53
Lagged Other Revenue	0.23	0.65	-0.91	-0.13		1.13ǂ	0.97	-0.58
Δ Net Utility Expenditure	0.76	0.26	0.82	2.46**	1.41ǂ		2.41*	1.94ǂ
Lagged Net Utility Expenditure	0.91	0.48	2.04**	1.27	1.13ǂ		0.16	1.71**
Δ Police, Fire, & Correct. Facilities	-1.66ǂ	-2.15*	-1.59	0.05	-1.01	-2.41*		-0.48
Lagged Police, Fire, & Correct. Facilities	0.75	0.32	1.88	1.11	0.97	-0.16		1.55
Δ Transportation Expenditure	-1.18	-1.67ǂ	-1.11	0.53	-0.53	-1.94ǂ	0.48	
Lagged Transportation Expenditure	-0.81	-1.23	0.33	-0.45	-0.58	-1.71**	-1.55	
Δ Higher Education Expenditure	0.11	-0.39	0.17	1.82	0.76	-0.65	1.77	1.29
Lagged Higher Education Expenditure	-2.34**	-2.77**	-1.21	-1.99	-2.12**	-3.25**	-3.09**	-1.54
Δ Secondary Education Expenditure.	-0.96**	-1.45*	-0.90	0.75	-0.31	-1.72**	0.70	0.22
Lagged Secondary Education Expenditure	-0.19	-0.62	0.94	0.17	0.03	-1.10	-0.94	0.61
Δ Health & Hospital Expenditure	-0.76	-1.26	-0.70	0.94	-0.11	-1.52	0.90	0.42
Lagged Health & Hospital Expenditure	-1.35	-1.78	-0.22	-0.99	-1.12	-2.26	-2.10	-0.55
Δ Parks, Rec., & Natural Res. Expenditure	-7.15ǂ	-7.65**	-7.09**	-5.45	-6.50**	-7.91**	-5.49	-5.97ǂ
Lagged Parks, Rec., & Natural Res. Exp.	-6.03**	-6.46**	-4.90ǂ	-5.68**	-5.81**	-6.94**	-6.78**	-5.23ǂ
Δ Wel., Unem., Hous., & Comm. Exp.	-0.26	-0.76	-0.20	1.44	0.39	-1.02ǂ	1.39	0.91
Lagged Wel., Unem., Hous., & Comm. Exp.	0.27	-0.15	1.41	0.63	0.50	-0.63	-0.47	1.08ǂ
Δ Other Expenditure	-0.44	-0.93	-0.38	1.27	0.21	-1.20	1.22	0.74
Lagged Other Expenditure	-0.35	-0.78	0.78	0.01	-0.13	-1.26	-1.10	0.45
Δ Net Intergovernmental Revenue	-0.71	-0.21	-0.77	-2.42**	-1.36	0.05	-2.37**	-1.89
Lagged Net Intergovernmental Revenue	-1.08	-0.65	-2.21**	-1.43	-1.30ǂ	-0.17	-0.33	-1.88*
Δ Surplus	0.16	-0.34	0.22	1.87	0.81**	-0.60	1.82**	1.34ǂ
Lagged Surplus	0.23	-0.20	1.37**	0.59	0.46ǂ	-0.67	-0.52	1.04ǂ
Constant	38.10*	38.10*	38.10*	38.10*	38.10*	38.10*	38.10*	38.10*

Note: The omitted fiscal variable is noted by the column heading. ǂ p<0.1; ** p<0.05; * p<0.01.

Table 6: Long-Run and Short-Run Effects of Disaggregated Revenues and Expenditures on Growth 1977-2010 (continued)

Variable	Higher Educ. Exp.	Second. Educ. Exp.	Health & Hosp. Exp.	Parks, Rec., & Nat. Res. Exp	Wel., Unem., Hous., & Comm. Exp.	Other Exp.	Net Intergov't. Revenue	Surplus
Lag Real Person. Inc. Per Capita	-6.89*	-6.89*	-6.89*	-6.89*	-6.89*	-6.89*	-6.89*	-6.89*
Unemployment Rate	-0.76*	-0.76*	-0.76*	-0.76*	-0.76*	-0.76*	-0.76*	-0.76*
Population Growth Rate	-0.56**	-0.56**	-0.56**	-0.56**	-0.56**	-0.56**	-0.56**	-0.56**
Δ Property Tax	0.11	-0.96**	-0.76	-7.15ǂ	-0.26	-0.44	0.71	0.16
Lagged Property Tax.	-2.34**	-0.19	-1.35	-6.03**	0.27	-0.35	1.08	0.23
∆ Sales Tax	-0.39	-1.45*	-1.26	-7.65**	-0.76	-0.93	0.21	-0.34
Lagged Sales Tax	-2.77**	-0.62	-1.78	-6.46**	-0.15	-0.78	0.65	-0.20
Δ Individual Income Tax	0.17	-0.90	-0.70	-7.09**	-0.20	-0.38	0.77	0.22
Lagged Individual Income Tax	-1.21	0.94	-0.22	-4.90ǂ	1.41	0.78	2.21**	1.37**
Δ Corporate Income Tax	1.82	0.75	0.94	-5.45	1.44	1.27	2.42**	1.87
Lagged Corporate Income Tax	-1.99	0.17	-0.99	-5.68**	0.63	0.01	1.43	0.59
Δ Other Revenue	0.76	-0.31	-0.11	-6.50**	0.39	0.21	1.36	0.81**
Lagged Other Revenue	-2.12**	0.03	-1.12	-5.81**	0.50	-0.13	1.30ǂ	0.46ǂ
Δ Net Utility Expenditure	0.65	1.72**	1.52	7.91**	1.02ǂ	1.20	0.05	0.60
Lagged Net Utility Expenditure	3.25**	1.10	2.26	6.94**	0.63	1.26	-0.17	0.67
Δ Police, Fire, & Correct. Facilities	-1.77	-0.70	-0.90	5.49	-1.39	-1.22	-2.37**	-1.82**
Lagged Police, Fire, & Correct. Facilities	3.09**	0.94	2.10	6.78**	0.47	1.10	-0.33	0.52
Δ Transportation Expenditure	-1.29	-0.22	-0.42	5.97ǂ	-0.91	-0.74	-1.89	-1.34ǂ
Lagged Transportation Expenditure	1.54	-0.61	0.55	5.23ǂ	-1.08ǂ	-0.45	-1.88*	-1.04ǂ
Δ Higher Education Expenditure		1.07	0.87	7.26**	0.37	0.55	-0.60	-0.05
Lagged Higher Education Expenditure		-2.15ǂ	-0.99	3.69	-2.62**	-1.99ǂ	-3.42*	-2.58**
Δ Secondary Education Expenditure.	-1.07		-0.20	6.19ǂ	-0.69	-0.52	-1.67ǂ	-1.12**
Lagged Secondary Education Expenditure	2.15ǂ		1.16	5.84**	-0.47	0.16	-1.27	-0.42
Δ Health & Hospital Expenditure	-0.87	0.20		6.39ǂ	-0.50	-0.32	-1.47	-0.92
Lagged Health & Hospital Expenditure	0.99	-1.16		4.68ǂ	-1.62	-1.00	-2.43	-1.58
Δ Parks, Rec., & Natural Res. Expenditure	-7.26**	-6.19ǂ	-6.39ǂ		-6.89ǂ	-6.71**	-7.86ǂ	-7.31**
Lagged Parks, Rec., & Natural Res. Exp.	-3.69	-5.84**	-4.68ǂ		-6.31**	-5.68ǂ	-7.11**	-6.27**
Δ Wel., Unem., Hous., & Comm. Exp.	-0.37	0.69	0.50	6.89ǂ		0.17	-0.97	-0.42
Lagged Wel., Unem., Hous., & Comm. Exp.	2.62**	0.47	1.62	6.31**		0.63	-0.80	0.04
Δ Other Expenditure	-0.55	0.52	0.32	6.71**	-0.17		-1.15	-0.60
Lagged Other Expenditure	1.99ǂ	-0.16	1.00	5.68ǂ	-0.63		-1.43ǂ	-0.58
Δ Net Intergovernmental Revenue	-0.60	-1.67ǂ	-1.47	-7.86ǂ	-0.97	-1.15		-0.55
Lagged Net Intergovernmental Revenue	-3.42*	-1.27	-2.43	-7.11**	-0.80	-1.43ǂ		-0.84
Δ Surplus	0.05	1.12**	0.92	7.31**	0.42	0.60	-0.55	
Lagged Surplus	2.58**	0.42	1.58	6.27**	-0.04	0.58	-0.84	
Constant	38.10*	38.10*	38.10*	38.10*	38.10*	38.10*	38.10*	38.10*

Note: The omitted fiscal variable is noted by the column heading. ǂ p<0.1; ** p<0.05; * p<0.01.

Table 7: Estimating Growth Hills for State and Local Revenues and Expenditure 1977-2010

Variable	Total Revenues	Prod. Expend.	Unprod. Expend.	Net Intergov't. Revenue	Surplus
Lag Real Per. Inc. Per Capita	-1.38*	-1.61*	-1.63*	-1.34*	-1.34*
Unemployment Rate	-0.26*	-0.24*	-0.25*	-0.23*	-0.23*
Population Growth Rate	-0.03	-0.10	-0.11	-0.09	-0.09
Total Revenues		0.56*	-0.01	0.70**	1.00*
Total Revenues Squared		-0.02*	-0.01*	-0.02*	-0.02*
Productive Expenditure	-0.93*		-0.61ǂ	-1.06*	-1.36*
Prod. Expend. Squared	0.05**		0.07*	0.06*	0.06*
Unproductive Expenditure	-1.02*	-1.50*		-1.47*	-1.77*
Unprod. Expend. Squared	0.02	0.04*		0.04**	0.04**
Net Intergov't. Revenue	-0.01	-0.09	-0.55*		0.30ǂ
Surplus	0.31*	0.40*	0.87*	0.30ǂ	
Constant	19.36*	13.90*	12.77*	15.23*	15.23*

Note: The omitted fiscal variable is noted by the column heading. ǂ p<0.1; ** p<0.05; * p<0.01.

Appendix 1: Fiscal Variable Series Construction

All variables are multiplied by 100 and divided by personal income. For further reading of variable definitions, refer to the Government Finance and Employment Classification Manual U.S. Bureau of the Census (2006).

Total Revenue = property tax + sales tax + individual income tax + corporate income tax + other revenue

Property Tax = property tax

Sales Tax = total sales and gross receipts tax + property sales tax – public utility tax

Individual Income Tax = individual income tax

Corporate Income Tax = corporate income tax

Other Revenue = total revenue - (property tax + sales tax+ individual income tax + corporate income tax) – liquor stores expenditure – total general charges – total utility revenue - publicutilitytaxt15

Net Intergovernmental Revenue = total intergovernmental revenue – total intergovernmental expenditure

Net Utility = total utility expenditure + solid waste management direct expenditure + sewerage direct expenditure – transit utility expenditure – (public utility tax + sewerage charges + solid waste management charges + total utility revenue – transit utility revenue)

Total Expenditure = net utility + police, fire, and corrections facilities + transportation + higher education + secondary education + hospital + parks recreation and natural resources + welfare + other expenditure

Police, Fire, and Corrections Facilities = police and fire protection expenditure + total corrections expenditure

Transportation = air transportation expenditure + total highways expenditure + water transportation expenditure + transit utility expenditure + parking expenditure - (air transportation charges + highways charges + water transportation charges + transit utility revenue + parking charges)

Higher Education = total higher education expenditure – total higher education charges

Secondary Education = elementary education expenditure – elementary school lunch charges

Hospital = health and hospitals expenditure - hospitals and health charges

Parks Recreation and Natural Resource = parks and recreation expenditure + total natural resources expenditure - (parks and recreation charges + natural resources charges)

Welfare = public welfare expenditure + unemployment compensation expenditure + housing community expenditure – housing and community charges

Other Expenditure = total expenditure - (police and fire protection expenditure + total corrections expenditure + total higher education expenditure + elementary education expenditure + health and hospital expenditure + total natural resources expenditure + parks and recreation expenditure + public welfare expenditure + housing community expenditure + unemployment compensation expenditure) – liquor stores expenditure – total utility revenue – sanitation expenditure – all other charges - (transit utility expenditure + air transportation expenditure + total highways expenditure + water transportation expenditure + parking expenditure)

Surplus = total revenue – total expenditure + net intergovernmental revenue

Appendix 2: Variables Averages by State

Table 2A1: State and Local Revenues: 1977 - 2010 presented in order of growth rate of real per capita state personal income, lowest to highest.

State	Growth		Total Rev.		Property Tax		Sales Tax		Ind. Income Tax		Corp. Income Tax		Inter. Gov. Rev.		Other Rev.		Surplus	
Average	1.89		18.70		3.13		3.50		1.96		0.45		4.13		9.65		5.08	
(CV)	0.20		0.29		0.32		0.32		0.57		0.90		0.35		0.54		0.49	
Alaska	0.42	L	51.00	H	4.76	H	1.83	L	0.33		2.92	H	6.78	H	41.16	H	16.12	H
Nevada	1.15	L	16.55		2.41		5.63	H	0.00	L	0.00	L	2.45	L	8.50		2.86	L
Michigan	1.28	L	18.73		3.97		3.08		2.35		0.84	H	3.65		8.48		4.35	
Idaho	1.48	L	17.76		2.66		3.34		2.46		0.40		3.91		8.89		5.41	
Hawaii	1.49	L	19.30		1.98		5.80	H	2.94		0.26		4.07		8.32		4.46	
Oregon	1.50		20.82		3.78		0.83	L	3.71	H	0.38		4.49		12.12		5.94	
Indiana	1.51		15.13	L	3.13		3.44		2.22		0.41		3.12		5.92	L	3.77	
Ohio	1.56		18.92		2.94		2.88		2.78		0.31		3.46		10.00		5.07	
California	1.58		18.71		2.88		3.38		2.65		0.72		3.15		9.09		3.93	
D.C.	1.59		18.62		1.61	L	1.24	L	3.38	H	0.79	H	3.61		11.59		5.28	
Illinois	1.67		15.85		3.64		2.98		1.68		0.44		2.97		7.10		3.40	
Montana	1.69		22.45		4.51		1.46	L	2.20		0.46		5.86	H	13.82	H	7.76	H
Arizona	1.70		17.32		3.21		4.62		1.50		0.37		3.29		7.61		3.12	
Utah	1.70		19.18		2.69		4.13		2.53		0.32		4.34		9.51		4.09	
Wisconsin	1.76		19.73		4.01		3.11		3.19		0.50		3.40		8.91		5.02	
Kansas	1.79		16.12		3.47		3.36		2.03		0.43		3.06		6.84		3.57	
Iowa	1.79		17.28		3.67		3.14		2.39		0.33		3.59		7.75		4.13	
Missouri	1.80		15.20		2.25		3.34		2.09		0.23		3.47		7.30		4.55	
West Virginia	1.83		21.00		2.03		4.52		2.14		0.56		5.55		11.76		6.47	
Washington	1.85		17.95		3.01		5.89	H	0.00	L	0.00	L	3.33		9.04		2.38	L
Oklahoma	1.89		16.55		1.72	L	3.64		2.00		0.26		3.71		8.94		4.58	
Pennsylvania	1.89		17.15		2.79		2.79		2.38		0.53		3.45		8.66		3.96	
Kentucky	1.89		18.29		1.84		3.65		2.85		0.47		4.49		9.48		5.07	
New Mexico	1.90		24.13	H	1.60	L	5.52	H	1.41		0.40		5.49		15.20	H	7.62	H
Texas	1.93		15.55		3.52		4.07		0.00	L	0.00	L	3.10		7.95		3.56	
Florida	1.93		14.40	L	3.11		4.07		0.00	L	0.29		2.68	L	6.92		2.94	L
Georgia	1.95		15.97		2.70		3.67		2.35		0.38		3.63		6.88		3.62	
Colorado	1.97		16.41		3.11		3.33		2.04		0.22		2.89		7.72		3.51	
Nebraska	1.97		16.19		3.85		3.38		1.94		0.30		3.40		6.71	L	3.13	
South Carolina	1.98		16.94		2.58		3.55		2.20		0.34		4.20		8.27		3.93	

State	Growth		Total Rev.		Property Tax		Sales Tax		Ind. Income Tax		Corp. Income Tax		Inter. Gov. Rev.		Other Rev.		Surplus	
North Carolina	2.01		16.31		2.21		3.22		2.83		0.50		3.72		7.55		4.37	
Arkansas	2.05		17.09		1.72		4.40		2.12		0.40		4.57		8.46		5.76	
Wyoming	2.05		28.82	H	5.15	H	4.01		0.00	L	0.00	L	7.00	H	19.65	H	12.13	H
Tennessee	2.06		14.88	L	2.05		4.92		0.11		0.44		4.04		7.38		4.12	
Minnesota	2.07		19.50		3.25		3.45		3.31		0.55		3.44		8.94		4.39	
Alabama	2.08		15.91		1.25	L	3.88		1.78		0.30		4.47		8.71		4.76	
Maine	2.12		20.05		4.35		3.62		2.52		0.36		4.93		9.19		5.72	
Maryland	2.13		15.84		2.64		2.48		3.63	H	0.28		2.95		6.81		3.68	
Mississippi	2.15		19.58		2.38		4.93		1.33		0.38		6.12	H	10.56		7.29	
New Jersey	2.17		16.37		4.68	H	2.44		1.85		0.56		2.63	L	6.84		3.35	
Rhode Island	2.18		19.93		4.35		3.03		2.24		0.37		4.58		9.94		5.06	
New York	2.19		23.11	H	4.33		3.37		4.15	H	0.94	H	4.38		10.33		5.61	
Louisiana	2.24		20.06		1.68	L	5.20	H	1.23		0.42		5.27		11.54		6.08	
Virginia	2.26		14.08	L	2.75		2.48		2.51		0.25		2.48	L	6.09	L	3.26	
North Dakota	2.30		20.91		3.02		3.74		1.09		0.50		5.49		12.56		7.54	
Vermont	2.33		20.08		4.76	H	3.14		2.28		0.37		5.39		9.52		6.27	
New Hampshire	2.38	H	13.65	L	5.11	H	1.44	L	0.15		0.71		2.92		6.24	L	3.09	L
Connecticut	2.38	H	15.27		4.05		3.25		1.70		0.56		2.64	L	5.70	L	2.98	L
South Dakota	2.40	H	18.10		3.51		4.39		0.00	L	0.19	L	4.90		9.99		5.97	
Massachusetts	2.50	H	17.11		3.81		2.24		3.38		0.69		3.35		7.00		3.15	
Delaware	2.82	H	26.88	H	3.91		3.43		3.80	H	0.76	H	10.86	H	14.98	H	10.83	H

Note: All numbers are percentages and averaged over the years covered. The first row presents the averages over all observations (states and time). The second row is the coefficient of variation (the standard deviation of the column divided by the average of the column). L means one of the lowest five states in this category (the exception of six for individual income tax). H means one of the highest five states in this category.

Table 2A2: State and Local Expenditures: 1977 - 2010 presented in order of growth rate of real per capita state personal income, lowest to highest

State	Total Exp.		Police, Fire, & Corr.		Trans.		High. Educ.		Elem. Educ.		Hosp.		Parks, Rec., & Nat. Res.		Welfare, Unemp., & Housing		Net Utility		Other Exp.	
Average	17.75		1.32		1.77		1.10		4.34		0.77		0.54		3.31		0.16		4.43	
(CV)	0.24		0.31		0.46		0.33		0.15		0.33		0.53		0.28		1.70		0.42	
Alaska	41.66	H	2.20	H	4.82	H	1.79	H	7.38	H	1.04	H	1.89	H	5.12	H	1.35	H	16.07	H
Nevada	16.14		1.89	H	1.80		0.82		3.62	L	0.53	L	0.71		2.08	L	0.14		4.54	
Michigan	18.03		1.45		1.21		1.16		4.78		0.95		0.35		3.89		0.26		3.97	
Idaho	16.26		1.26		1.95		1.31		4.14		0.56		0.62		2.85		0.10		3.47	
Hawaii	18.91		1.21		1.26		1.51		3.51	L	1.06	H	0.82	H	3.45		-0.05		6.14	H
Oregon	19.38		1.58		1.78		1.36		4.60		0.77		0.49		3.48		0.14		5.18	
Indiana	14.48	L	1.06		1.17	L	0.96		4.16		0.55	L	0.33		2.91		0.18		3.16	L
Ohio	17.31		1.32		1.24		0.78		4.29		0.88		0.29		3.77		-0.02		4.75	
California	17.92		1.75		1.15	L	1.17		3.80		0.87		0.51		3.54		0.14		5.00	
D.C.	16.95		1.38		1.33		1.14		4.09		0.80		0.51		3.07		-0.10		4.74	
Illinois	15.43		1.33		1.53		0.80		3.75		0.74		0.42		3.22		-0.21	L	3.86	
Montana	20.55		1.20		2.71		1.05		5.25	H	1.04		0.93	H	3.19		0.03		5.15	
Arizona	17.49		1.79	H	1.75		1.31		4.17		0.74		0.63		2.53		0.33		4.25	
Utah	19.43		1.35		1.98		1.82	H	4.80		0.58		0.68		2.76		0.75	H	4.70	
Wisconsin	18.11		1.45		1.76		1.35		4.68		0.69		0.51		3.81		0.20		3.66	
Kansas	15.61		1.11		1.88		1.31		4.16		0.64		0.43		2.51		0.01		3.56	
Iowa	16.74		0.98	L	2.19		1.37		4.36		0.67		0.51		3.24		0.19		3.24	
Missouri	14.12	L	1.17		1.52		0.73		3.88		0.80		0.39		2.78		-0.09		2.94	L
West Virginia	20.09		0.87	L	2.33		1.09		5.02	H	0.63		0.50		4.20		-0.12		5.57	
Washington	18.90		1.36		1.79		1.25		4.23		0.93		0.56		3.29		0.50	H	4.98	
Oklahoma	15.68		1.24		1.45		1.11		4.23		0.59		0.39		2.97		0.08		3.61	
Pennsylvania	16.64		1.12		1.41		0.57	L	4.16		0.71		0.28	L	4.22		-0.12	L	4.30	
Kentucky	17.71		1.13		1.94		1.21		3.85		0.58		0.44		4.04		0.06		4.45	
New Mexico	22.00	H	1.75		2.50		2.05	H	5.19	H	0.99		0.77		3.62		0.15		4.99	
Texas	15.09		1.28		1.46		1.19		4.43		0.76		0.36		2.32	L	0.11		3.18	L
Florida	14.15	L	1.65		1.30		0.76		3.65	L	0.77		0.70		2.22	L	-0.20	L	3.31	
Georgia	15.98		1.36		1.62		0.99		4.31		0.78		0.38		2.82		0.34		3.39	
Colorado	15.80		1.38		1.64		0.94		3.98		0.63		0.56		2.27	L	0.32		4.08	

State	Total Exp.		Police, Fire, & Corr.		Trans.		High. Educ.		Elem. Educ.		Hosp.		Parks, Rec., & Nat. Res.		Welfare, Unemp., & Housing		Net Utility		Other Exp.	
Nebraska	16.45		1.06		1.99		1.32		4.43		0.48	L	0.59		2.70		0.64	H	3.23	
South Carolina	17.21		1.26		1.14	L	1.17		4.56		0.95		0.40		3.31		0.39		4.03	
North Carolina	15.66		1.28		1.33		1.45		3.95		0.91		0.45		2.89		0.17		3.24	
Arkansas	15.90		1.06		1.67		1.16		4.28		0.54	L	0.43		3.56		0.01		3.19	
Wyoming	23.69	H	1.52		3.42	H	1.76	H	6.06	H	0.94		1.26	H	2.37		0.39	H	5.95	H
Tennessee	14.81		1.22		1.43		1.01		3.46	L	0.74		0.35		3.33		0.25		3.02	L
Minnesota	18.54		1.06		1.88		1.05		4.50		0.69		0.60		4.33		0.18		4.25	
Alabama	15.63		1.17		1.54		1.40		3.91		0.86		0.39		3.02		-0.29	L	3.63	
Maine	19.25		1.07		1.68		0.80		4.60		0.82		0.50		4.97	H	0.28		4.53	
Maryland	15.11		1.43		1.28		0.88		3.75		0.65		0.48		2.69		0.05		3.90	
Mississippi	18.41		1.16		2.06		1.47		4.41		0.75		0.54		3.82		0.10		4.11	
New Jersey	15.65		1.30		1.04	L	0.63		4.45		0.63		0.24	L	3.09		-0.21	L	4.48	
Rhode Island	19.46		1.54		1.20		0.72		4.21		0.84		0.30		4.93	H	0.11		5.60	H
New York	21.89	H	1.76	H	1.77		0.79		4.83		1.34	H	0.30		5.07	H	0.22		5.80	H
Louisiana	19.25		1.55		1.86		1.00		4.29		1.14	H	0.71		3.57		0.20		4.94	
Virginia	13.30	L	1.26		1.42		0.89		3.86		0.59		0.31		2.14	L	-0.09		2.93	L
North Dakota	18.86		0.85	L	2.76	H	1.56	H	4.46		0.62		0.94	H	3.45		-0.01		4.23	
Vermont	19.21		1.04		2.16		0.91		4.92		0.66		0.52		4.44		0.16		4.39	
New Hampshire	13.49	L	1.03	L	1.25		0.43	L	3.74		0.52	L	0.23	L	2.91		0.16		3.21	
Connecticut	14.92		1.13		1.10	L	0.56	L	3.64	L	0.83		0.20	L	3.01		0.02		4.43	
South Dakota	17.03		0.98	L	2.76	H	0.91		4.21		0.71		0.78		2.58		0.32		3.79	
Massachusetts	17.32		1.32		1.49		0.52	L	3.67		0.94		0.22	L	4.13		0.34		4.68	
Delaware	26.91	H	3.47	H	5.12	H	0.48	L	4.08		2.02	H	0.46		6.76	H	0.19		4.33	

Note: All numbers are percentages and averaged over the years covered. The first row presents the averages over all observations (states and time). The second row is the coefficient of variation (the standard deviation of the column divided by the average of the column). L means one of the lowest five states in this category. H means one of the highest five states in this category.

Works Cited

Bania, Neil, Jo Anna Gray, and Joe A. Stone. "Growth, Taxes, and Government Expenditures: Growth Hills for U.S. States." *National Tax Journal*, 2007: 193-204.

Barro, Robert J., and Xavier Sala-i-Martin. *Economic Growth.* New York: McGraw-Hill, 1995.

Barro, Robert J., and Xavier Sala-i-Martin. "Convergence." *Journal of Political Economy*, 1992: 223-51.

Barro, Robert J., and Xavier Sala-i-Martin. "Public Finance in Models of Economic Growth." *Review of Economic Studies*, 1992: 645-61.

Besci, Zsolt. "Do State and Local Taxes Affect Relative State Growth?" *Economic Review*, 1996: 18-36.

Bleaney, Michael, Norman Gemmell, and Richard Kneller. "Testing the Endogenous Growth Model: Public Expenditure, Taxation, and Growth over the Long Run." *Canadian Journal of Economics*, 2001: 36-57.

Brown, Stephen P.A., Kathy J. Hayes, and Lori L. Taylor. "State and Local Policy, Factor Markets, and Regional Growth." *The Review of Regional Studies*, 2003: 40-60.

Evans, Paul, and George Karras. "Are Government Activities Prooductive? Evidence from a Panel of U.S. States." *Review of Economics and Statistics*, 1994: 1-11.

Gemmell, N., R. Kneller, and I. Sanz. "Fiscal Policy Impacts on Growth in the OECD: Are They Long- or Short-Term?" *Mimeo* (University of Notttingham), 2006.

Helms, L. Jay. "The Effect of State and Local Taxes on Economic GrowthL A Time Series Cross Section Approach." *The Review of Economics and Statistics*, 1985: 574-82.

Kneller, R., M.F. Bleaney, and N. Gemmell. "Fiscal Policy and Growth: Evidence from OECD Countries." *Journal of Public Economics*, no. 74 (1999): 171-190.

Lucas Jr., R. E. "Supply side economics: an analytical review." *Oxford Economic Papers*, no. 42 (1990): 293-316.

McLure, Charles E., Jr. "Taxation, Substitution, and Industrial Location." *Journal of Political Economy*, 1970: 112-132.

Miller, Stephen M., and Frank S. Russek. "Fiscal Structures and Economic Growth at the State and Local Level." *Public Finance Review* 225, no. 2 (March 1997): 213-237.

Mofidi, Alaeddin, and Joe A. Stone. "Do State and Local Taxes Affect Economic Growth?" *The Review of Economics and Statistics*, 1990: 686-691.

Mullen, John, and Martin Williams. "Marginal Tax Rates and State Economic Growth." *Regional Science*

and Urban Economics, 1994: 687-705.

Neumann, George R., and Robert H. Topel. "Employment Risk, Diversification, and Unemployment." *Quarterly Journal of Economics*, 1991: 1341-65.

Ojede, Andrew, and Steven Yamarik. "Tax Policy and State Economic Growth: The Long-Run and Short-Run of It." *Economics Letters*, 2012: 161-165.

Phillips, Joseph, and Ernest Goss. "The Effect of State and Local Taxes on Economic Development: A Meta-Analysis." *Southern Economic Journal*, 1995: 320-33.

Reed, W. Robert. "The Robust Relationship between Taxes and U.S. State Income Growth." *National Tax Journal*, 2008: 57-80.

Reed, W. Robert, and Cynthia L. Rogers. "Tax Burden and the Mismeasurement of State Tax Policy." *Public Finance Review*, 2006: 404-426.

Romans, Thomas, and Ganti Subrahmanyan. "State and Local Taxes, Transfers, and Economic Growth." *Southern Economic Journal*, 1979: 435-452.

Stokey, N.L., and S.t. Rebelo. "Growth Effects of Flat-Rate Taxes." *Journal of Political Economy* 103 (1995): 519-550.

Tomljanovich, Marc. "The Role of State Fiscal Policy in State Economic Growth." *Contemporary Economic Policy*, 2004: 318-330.

U.S. Bureau of the Census. *Government Finance and Employment Classification Manual.* Washington D.C., 2006.

Wasylenko, Michael. "Taxation and Economic Development: The State of the Economic Literature." *New England Economic Review*, 1997: 37-52.

Wasylenko, Michael, and Therese McGuire. "Jobs and Taxes: The Effect of Business Climate on States' Employment." *National Tax Journal*, 1985: 497-511.

Widmalm, F. "Tax Structure and Growth: Are Some Taxes Better Than Others?" *Public Choice*, no. 107 (2001): 199-219.

Yamarik, Steven. "Can Tax Policy Help Explain State-Level Macroeconomic Growth?" *Economics Letters*, 2000: 211-215.