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AN ANALYSIS OF STATE AND LOCAL PUBLIC EXPENDITURE AND OUTPUT-MAXIMIZING SPENDING OPTIMUMS

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Abstract

Much academic literature exists surrounding the relationship between government size and economic output at the federal level, yet only a few studies investigate such a relationship at the sub-federal level. This work concentrates on the relationship between the public sector and economic performance using data from state and local governments within the US states over the 1976-2005 period. Thus, the purpose of this quantitative study is to investigate the effects of public expenditure on the economic output of the states. This investigation seeks a unique government spending optimal for each of the 50 US states by applying methodology developed for the federal level by Richard Vedder and Lowell Gallaway. Therefore, a secondary purpose of this study is to test the applicability of their model for the state and local level. The findings do not confirm the existence of state-specific spending optimums in a consistent manner, suggesting the model is not transferable to the sub-federal level. Using a modified time setting and aggregate state and local spending data, regression results provide confirmation of an Armey Curve and a spending optimal that is several percentage points higher than the Vedder and Gallaway conclusion. This finding strengthens the argument that the relationship between the public sector and economic growth depends on elements that change with time. Since theoretically there should exist an optimal level of spending for each state and expenditure category, further study is warranted.

AN ANALYSIS OF STATE AND LOCAL PUBLIC EXPENDITURE AND OUTPUT-MAXIMIZING SPENDING OPTIMUMS

Chapter I

Introduction

Problem Statement

Much research concludes that two fiscal variables weaken economic performance through their negative effects on work, income, savings, and profit. Those two variables are *excessive public spending* and a *demotivating tax structure* (Vreyman and Verhulst, 2005). This study focuses on the former. While there is much academic literature surrounding the relationship between government size and economic output at the federal level, only a few studies investigate such a relationship at the state and local level. This work concentrates on the relationship between the public sector and economic performance using data from state and local governments within the US states over the 1976-2005 period. Thus, the purpose of this quantitative study is to investigate the effects of public expenditure on the economic output of the states. This investigation seeks a unique government spending optimal for each of the 50 US states by applying methodology developed for the federal level by Richard Vedder and Lowell Gallaway. Therefore, a secondary purpose of this study is to test the applicability of their model for the state and local level.

Analyzing the effect of state and local government spending on the economic output of the United States is worthy of study for several reasons. There are vast amounts of political rhetoric on both sides of the "size matters" debate, yet there is a lack of state-specific investigation. Where there has been investigation (Vedder and Galloway, 1998), there was a one-size-fits-all conclusion: no state-specific recommendations were made about the level of government spending necessary to maximize economic prosperity. However, because the US states have different maturities, incomes, populations, sizes, and locales, the optimums may differ across states according to their social and economic structures. This researcher is interested in an optimal range of government sizes across the states and a unique mix of spending for each of them.

Such a study is reasonable because the states within the United States enjoy considerable autonomy, especially for tax and expenditure policy. The states act independently to set tax rates, exemptions, deductions, credits, and to borrow and spend. Thus, the states have the tools necessary to conduct economic policy. Where there is not autonomy, such as with interest rates and federal taxes, all states are under the same umbrella. Also, the states share harmonious accounting standards so it is straightforward to separate the effects of different types of government spending and to draw comparisons across states. Furthermore, the data is readily available from various government entities.

Background of the Problem

Industrialized countries across the globe increasingly share many commonalities because of converging cultures, languages, and even currencies.

Another such likeness is the expansion of government. Measuring government size by the share of GDP going to government spending, Gwartney et al. found that Organization for Economic Co-operation and Development (OECD) countries expanded their public sectors by an average of 21 percentage points between 1960 and 1996 (Gwartney, Halcombe and Lawson, 1998). More recently, an OECD publication reports that after several decades of marked growth, government expenditure as a percentage of GDP has moderated slightly to stand at approximately 41 percent in 2003, but expects upward pressure on public spending due to ageing populations (Joumard et al., 2004). This trend toward bigger government has attracted many criticisms including that of hampering economic growth. Most notable is the leading work by Barro (1990, 1991) which supported the criticism that a large public sector hinders economic prosperity. Engen and Skinner (1992), Hansson and Henrekson (1994), Grier (1997), and Fölster and Henrekson (1999, 2001), offered further evidence validating the negative correlation between government size on economic growth. Conversely, there are researchers who remain skeptical about the validity of the Barro conclusion on government size. Atkinson (1995), Slemrod (1995, 1998) and Agell et al. (1997, 1999) found no conclusive association between the government size and economic prosperity.

The ongoing debate in the academic community is predictable as government size and economic output is expected to have at least some association. Although public spending can displace private investment, it can also promote productivity in the private sector. Some public investment (to develop infrastructure, establish a stable monetary system, and institute a legal system to protect property rights and

enforce contracts) provides the foundation for a functioning market economy and is an absolute necessity for private sector productivity. Thus, both the positive and negative effects of public spending must be considered (Vreyman and Verhulst, 2004). Slemrod (1995) suggests the negative impact of government size on economic output exists only if the size exceeds some upper limit. Given the aforementioned trade-off between positive externalities associated with government spending and negative externalities related to the crowding-out of private investment, it is expected that the relationship between government spending and economic output should follow an "inverted U" shape. This is discussed in further detail in the following section.

Theoretical Framework

The "inverted U" shaped relationship between government size and economic output is called the "Armey Curve" after Dr. Richard Armey, an economist and former Member of the United States House of Representatives (a similar version of the curve is known as the Rahn Curve). This argument posits that in those countries with a large role for government, the share of public spending designed to stimulate private sector productivity is usually less than in countries with a small role for government (Fölster and Henrekson, 2001). In developing economies, public spending may show the private sector will be supported, thus an increase in the size of government would likely stimulate economic growth. It should be noted, however, that a small government is not a sufficient condition for increases in government spending to have positive effects on output. When government is not big enough it

cannot provide basic enforcement of property rights or contracts, which are necessary conditions for economic growth (Gwartney, et al., 1998).

On the other hand, a government so large that it excessively engages in wealth transfers and regulations would not be likely to promote prosperity. Former Senator Barry Goldwater framed well the government size predicament by stating "a government that is big enough to give you all you want is big enough to take it all away" (1964). Political economist Barry R. Weingast (1995) refined the statement by saying "the fundamental political dilemma of an economic system is this: a government strong enough to protect property rights and enforce contracts is also strong enough to confiscate the wealth of its citizens" (p. 1). Both Goldwater and Weingast caution against excessive government spending.

Modeled after the work of Author Laffer who sought optimal tax rates as a function of maximal tax receipts, Armey (1995) and Barro (1990) are interested in finding the optimal government spending level as a function of maximizing wealth creation. Armey suggests that without government there is anarchy and little economic growth because there is no rule of law or secure property rights. He argues that in anarchical societies, there exists little incentive to work, save and invest, due to the fear of expropriation. Additionally, the lack of investment in critical infrastructure, like transportation and technology, leads to poor levels of productivity and wealth. Likewise, when all economic decisions are made by the public sector, wealth creation is lacking because citizens have little incentive to produce when tax rates must be high in order to finance the excessive government spending. However, when there is a combination of private and public decisions on the distribution of

productive factors, economic output should be greater (Armey, 1995, Vreyman and Verhulst, 2004).

As the public sector is initially established, production grows. Law and order is instituted, critical infrastructure is built and productivity is increased. Also, educational and social institutions are implemented to further aid economic development. In the initial development stages, often the productivity of sound public expenditure policy yields a higher return than the productivity of private investment, so government outlays actually encourage economic growth. Yet, additional public projects are subject to diminishing returns and will increasingly lose their productive advantage over private investment. Also, the growing tax burdens needed to finance government spending will progressively be a disincentive to produce. Eventually, the growth producing elements of public spending will decrease and further expansion of the public sector will no longer lead to increases in output. Thus, the shape of the Armey Curve is an "inverted U", similar to the Laffer Curve. (Armey, 1995, Vreyman and Verhulst, 2004)

Significance of the Problem

Vedder and Gallaway (1998) verified the existence of the Armey Curve in the US and other OECD countries using multiple linear regression. Their results suggest many Western economies, including the US, are in the downward-sloping section of the Armey Curve where a decrease in the size of the public sector would be expected to produce economic growth. Other literature examining the relationship between government size and economic growth for developed countries is consistent with the Vedder and Gallaway study (Pevcin, 2004, Vreyman and Verhulst, 2004). Bleaney et

al. (2001) tested a Barro-style endogenous growth model for OECD countries over the period 1970-1995. The cross-country study focused on government taxing and spending and isolated the differences in "productive" and "nonproductive" public expenditures. Their results confirm the endogenous growth model, showing taxes to impede steady-state growth rates while some "productive" public expenditures increase these rates (Bleaney, et al., 2001).

From an economic growth perspective, these investigations suggest that the level of government spending is above the optimal level throughout the world and in the US. This non-optimal size of government is costly. Indeed, Vedder and Gallaway (1998) have estimated that a reduction in the federal government spending level to their estimated optimum (at 17.45% of GDP) would be associated with an increase in national GDP of $30 billion per year. According to Vedder and Gallaway, "This is a permanent increase. The present value of that increase over, say, the next generation reaches into several hundred billion dollars. It is certainly worth doing." (p. 7)

According to this researcher's knowledge, only a few authors have investigated these growth effects on the sub-federal level. Exceptions are Schaltegger and Torgler (2006), with evidence from the Swiss cantons, Holcombe and Lacombe (2004), Mark et al. (2000), Vedder and Gallaway (1998), Modfidi and Stone (1990), and Helms (1985) with evidence from the US state level. Helms and Modfidi-Stone found that some productive tax expenditures can enhance growth. Holcombe-Lacombe and Mark, et al. found that tax increases in general usually impede growth. Many other studies have undertaken the question of "motivating" versus "demotivating" tax structures to find the optimal mix of taxation. The questions of

productive versus nonproductive government expenditures and motivating versus demotivating tax structures are all relevant, but secondary to the question of optimal size of government. Only when an output maximizing size of government is determined, can types of spending and tax structures be of relevance. Before one knows how much government expenditure is desirable, one cannot determine the right mix of spending. Before one knows how much tax should be collected, one cannot know the correct mix of taxation.

Growth differences among the US states are significant. Despite having similar macro conditions, large growth differentials among the states are observed. For example, in the ten year period from 1995-2005, Mississippi gross state product (GSP) grew at a 4.1% annual growth rate, while Nevada grew at 7.9% annual growth rate during the same period. This observation raises the question as to what causes these remarkable growth differences and if other states could achieve a higher level of economic performance. Results from the present study could help set benchmarks to target an economic output-maximizing spending level. The present study is desirable as conclusions could help policymakers maximize economic output and enhance the quality of life of the citizenry.

Overview of Methodology

This study assesses the relationship between government spending and economic output at the state and local government level. Data on these variables is obtained from public-domain sources such as the Bureau of Economic Analysis, Bureau of Labor Statistics and Bureau of the Census. Data from years 1976 through 2005 is utilized for the analysis.

Following the procedure outlined in Vedder and Gallaway (1998), the relationship between government spending and real economic output is assessed with multiple linear regression analysis, in which yearly economic output is set to be the dependent variable and state and local government spending is set to be one of the independent variables. Other independent variables include a time trend and the unemployment rate to control for the effect of the business cycle on economic output. More importantly, following Vedder and Gallaway's methodology, a squared term for state and local government spending is included as an independent variable. This term permits testing for the existence of an Army Curve as it allows the nonlinear relationship between government spending and economic output. Alternative definitions of "government spending" are used in the individual regression models. Thus, in addition to testing the relationship between total state and local government spending and economic output, the effects of several components of government spending on economic output are tested.

Separate regression analyses are performed for each of the 50 US states and for the US in aggregate. This is of utmost importance as separate regression estimates for each state are needed to test state-specific, output-maximizing government spending levels. The specific regression model used to estimate for each of the states is the following one:

$$O = a + bG - cG^2 + dT - eU$$

where O is total real output, G is government spending (as a percentage of economic output), T is the time trend and U is the unemployment level. The relationship between government spending and output is given by coefficients b and c. If b is

positive and *c* is negative and statistically significant, then this would suggest the existence of an Armey Curve (as the relationship between government spending and economic output would resemble a concave parabola). In the cases were an Armey Curve is found, the output-maximizing government spending rate is simply defined as $-b/2c$.

Limitations and Delimitations

The present study is limited to the analysis of government spending and economic output in the US states during the period of 1976-2005. The effects of other variables on economic output (other than unemployment and time) are not considered in this study. Given one underlying assumption in the present analysis is that each state has an associated specific government spending rate, results from the present study are not suitable for other countries.

Because multiple linear regression is used to assess the relationship between government spending and output, another limitation of the present study is it is only possible to draw an association between the variables and not a relationship of causality. The regression coefficients could be biased since other factors that might influence economic growth, such as countercyclical macro policies, innovation or institutions, are not included.

Finally, it must be noted that the "optimal" government spending rate sought is one which maximizes economic output. This definition does not take into account matters of social consciousness and politics. For instance, there is no guarantee of correlation between the maximization of economic output and the maximization of social welfare.

Summary

The purpose of this quantitative study is to (a) assess the relationship between state and local government spending and state level economic output, and (b) assess (if it exists) the economic output-maximizing government spending level for each state. To address these objectives, data on the US states from 1976 through 2005 is utilized. Multiple linear regression following the methodology outlined by Vedder and Gallway (1998) is used to assess the relationship between government spending and economic output, and to assess whether an Armey Curve exists individually for each state. If it exists, the output-maximizing government spending rate is computed based on the regression coefficients.

Chapter two presents a review of the literature on the impact of government spending on economic growth. Next, chapter three details the methodology used in the present study. Chapter four provides a description of the results of the regressions. Lastly, chapter five presents a discussion of the results, implications and limitations of the study as well as suggestions for further research.

Chapter II

Literature Review

In this chapter, a review of the literature related to the relationship between government size and economic growth is presented. First, a brief discussion of the Armey Curve, an "inverted U" shape depicting the relationship between government spending and economic growth such that the effect of an increase in government spending is positive for low levels of spending and negative for higher ones. Following that, investigations related to the impact of government spending and taxation on economic growth at the national level are presented, showing there are opposing views on this issue. For example, some authors suggest a negative impact of government spending on economic growth (such as Vreyman and Verhulst, 2005 and Fölster and Henrekson, 2001); while others suggest a positive impact (such as Ram, 1986) or no impact at all (such as Agell, et al., 1999 and Mendoza, et al., 1997). The next section presents a review of the findings related to the effects of government spending at the state and local level. Next, a review of literature related to the effect of different components of government spending on economic growth is presented. Finally, a discussion of commonly accepted growth determinants and economic convergence is offered.

Growth Theory

Models based on the neoclassical growth theory predict that government spending cannot affect the steady-state growth rate of countries. In these models,

government spending may have an effect on the transition to the steady-state; however, steady-state growth depends primarily on technological change, which is taken to be an exogenous variable. Therefore, there is no place in such models to examine the role of government spending on the long-term growth of economic output (Solow, 1956).

By contrast, models developed more recently, such as that from Barro (1990), in which steady-state growth is considered to be endogenous rather than exogenous, leave room for government spending to have an impact on the long-term growth of economic output. In these models, steady-state growth does not necessarily depend on an exogenous technological change, but can also be related to endogenous government spending. In particular, although the steady-state growth rate may still be tied to technology in these models, technological change and government spending in certain areas can be related, thus representing an association between government spending and long-term growth.

The present analysis is grounded on the main idea behind endogenous growth models; namely, that government spending may have an impact on long-term economic growth. As was discussed in the previous section, the relationship between these two variables may not be monotonic yielding the possibility of an optimal level of government spending that maximizes steady-state growth.

The Armey Curve

The Armey Curve depicts the nature of the relationship between government spending and economic growth. It is argued that the relationship between government spending and economic growth has an "inverted U" shape. This relationship suggests

that “very low” levels of government spending can be detrimental to economic growth, but so can be “very high” levels of government spending (Armey, 1995). Given this relationship, there theoretically exists an optimal level of government spending, in the sense that it is related to the maximum possible economic growth (measured by change in GDP).

The rationale behind the shape of the Armey Curve depends on the productivity of government spending. If there is no government presence in a country, it is likely that there will be no rule of law and no protection of property rights. Without protection of property rights, there exists little incentive for private investment as there is great risk that any investment will be stolen or destroyed. Moreover, with no private sector initiatives there are few incentives for government to undertake public investments, such as the development of infrastructure and human capital. Given that such public investment reduces transaction costs, it is understandable that without any government spending the rate of economic growth would be greatly reduced (Vedder and Gallaway, 1998).

However, “too much” government spending can also be harmful to economic growth. Vedder and Gallaway (1998) argue: “As governments grow, the law of diminishing returns begins operating. While the construction of roads initially assists output expansion, the construction of secondary roads and upgrading primary roads start to have less added positive impact per dollar spent. Moreover, the taxes and /or borrowing levied to finance government impose increasing burdens” (p. 2).

The rationale behind the Armey Curve is similar to that of the Laffer Curve. The Laffer Curve depicts the nature of the relationship between tax rates and

revenues, and suggests this relationship also has an "inverted U" shape. This is because, beyond a certain point, increases in the tax rate are associated with a decrease in economic output, causing the tax base to be reduced. Therefore, increases in the tax rate could yield a reduction in tax revenues.

Based on these considerations, there should exist an "optimal" government spending level where economic growth is maximized. This would happen at the point where the marginal benefits of government spending begin to outweigh its marginal costs. There has been extensive research aimed at estimating this optimal government spending level for the US and other developed countries, and comparing that level to the actual level of government spending. In most cases, it has been shown that government spending is excessive. The following sections present a review of the literature related to the relationship between government spending and economic growth.

Relationship between Government Spending and Economic Growth at the National Level

The analysis presented in this study is based mainly on the work of Vedder and Gallaway (1998). In their article, the researchers tested Friedman's (1997) claim: "Government has an essential role to play in free and open society. Its average contribution is positive; but I believe that the marginal contribution of going from 15% of the national income to 50% has been negative" (p. 14). Thus, Friedman claimed the optimal level of government spending would be between 15% and 50% of gross domestic product.

In order to test whether the relationship between government spending and economic growth indeed follow an "inverted U" shape and to find the optimal level of government spending, Vedder and Gallaway (1998) used multiple linear regression analysis. They used yearly US data at the national level from 1947 through 1997. The specific model tested in their work was as follows:

$$O = a + bG - cG^2 + dT - eU$$

where O is total output, G is government spending (as a percentage of national income), T is a time trend and U is the unemployment level. Variables T and U were included to control for the upward trend in output (due to changes in technology, human capital, etc.) and to variations due to the business cycle. The relationship between government spending would be given by coefficients b and c.

Vedder and Gallaway (1998) found a negative and significant coefficient for c, which confirmed the existence of the Armey Curve at the national level. Using this equation, they estimated output to be maximized at the point where government spending equals 17.45% of GDP. Other specifications of the model (with data from as far back as 1799 and using five and ten-year averages to smooth the variables) show an optimal government spending level of 11-13% of GDP. Moreover, when using state and local government spending (instead of national spending) as independent variable, they found the optimal state and local government spending rate to be 11.42% for all states. Vedder and Gallaway concluded that current government spending in the US (at the national, state and local level) is higher than the optimal one. Therefore, reducing government spending would be beneficial to the economy.

Vedder and Gallaway (1998) repeated the analysis for other countries (Canada, Denmark, Italy and Sweden), again at the national level. In each case, evidence towards the existence of an Armey Curve was found. Moreover, they found that government spending in each country is "excessive" in the sense that it was higher than the optimal level as given by the Armey Curve equation.

There is a fairly large volume of research in which a significant negative relationship between government size and economic growth is found. Probably the most well-known research carried out in this field is that of Robert Barro. In his influential paper (which spurred much research based on the methodology of "Barro-type regressions"), Barro (1991) examined the determinants of economic growth using a sample of 98 countries and data aggregated by five-year periods from 1960 through 1985. Among other conclusions, Barro found government consumption as a proportion of GDP is negatively related to economic growth. On the other hand, no significant relationship was found between public investment and economic growth. Different effects on economic growth depending on the type of government spending (in this case, consumption or investment) were found in other analyses and are discussed in the next section.

The "inverted U" shape of the relationship between government size and economic growth was also examined by Slemrod (2002). While this study mostly focused on the impact of "trustworthiness," tax cheating and government size, a regression was performed to assess the impact of government spending on economic prosperity. Slemrod found some evidence of the existence of an Armey Curve in the US, suggesting the marginal effect of increases in public sector size is positive for

smaller governments, and became negative when government size grew to between 31% and 38% of GDP. However, these findings were not conclusive because the regression coefficients associated to government spending were not significant. It is possible this non-significant result is due to the relatively small sample size that was used in Slemrod's analysis.

Vreyman and Verhulst (2005) found similar results in terms of the impact of government spending on economic growth in an analysis of growth differentials among European countries. Their analysis involved a panel regression with data for 17 European countries (including the 12 Euro countries, three non-Euro EU members and two non-EU members) from 1985 through 2002. Several factors were considered as potential determinants of growth differentials among the countries in the sample. One of these factors was government spending. Based on the work of Prevcin (2004), Vreyman and Verhulst assumed that these European countries were on the "bad" side of the Armey Curve and excluded a squared term for government spending in the regression analysis. The results found in this study provide evidence that European governments are oversized as highly significant negative relationships were found between government spending and economic growth. Therefore, Vreyman and Verhulst's results were consistent with those of Vedder and Gallaway (1998) in finding a negative relationship between government spending and growth at the observed levels of government spending.

Grier and Tullock (1989) used a similar panel regression methodology in a study on economic growth across 113 countries (including both OECD and non-OECD member countries). Findings from this study showed there is a fairly robust

negative correlation between government consumption and economic growth. These results are consistent with the hypothesis that most developed countries are in the "bad" side of the Armey Curve, such that lowering government spending would help increase economic growth rates. Another important contribution from Grier and Tullock is that their study countries did not share a common set of coefficients for the independent variables, suggesting it would be incorrect to pool them. This finding helped motivate the hypothesis from the present study, which posits there is not a universal optimal level of government spending; rather the optimal point would depend on the individual characteristics of each state.

Fölster and Henrekson (1999, 2001) used a similar approach to estimate the effect of government spending and taxation across several countries. They performed the analysis using yearly data (from 1970 through 1975), from a sample of 23 OECD countries. Fölster and Henrekson considered separate models including either total government expenditure as a proportion of GDP or total tax revenue as a proportion of GDP, to explain economic growth. Control variables included investment share of GDP, the growth rate of labor force, growth of human capital, initial income (to account for convergence effects), and country-specific variables. Time period dummy variables were included to avoid spurious correlations given that all countries experienced slower growth rates during the 1970s and 1980s; while the country specific variables were included to account for effects such as culture and social norms.

In order to account for possible heteroscedasticity issues present in their data, Fölster and Henrekson (1999, 2001) used weighted least squares in addition to

ordinary least squares to estimate the regressions on economic growth. Their findings show no significant relationship between tax revenues and economic growth and a significant negative association between government expenditure and economic growth. In particular, they found that increasing the expenditure ratio by ten percent of national income is related to an annual growth rate that was 0.7 to 0.8 percentage points lower. The regression coefficient associated to government expenditure is negative and significant when using either ordinary least squares or weighted least squares regressions. Moreover, their results are robust to the inclusion of unemployment as an independent variable used to account for business cycle fluctuations.

Fölster and Henrekson (1999, 2001) further extended their analysis by including a robustness test for the coefficients which determined the relationship between economic growth and government spending and tax revenues. The rationale for conducting this test was because other studies (such as Easterly and Rebelo, 1993) found the relationship between government expenditure and economic growth became non-significant when a particular set of control variables was included in the regression. The robustness test involved computing a large number of regressions, including the variables of interest (government expenditure and tax revenue) and all possible combinations of control variables, and then verifying the estimated coefficients for the variables of interest. The researchers concluded the observed negative relationship between government expenditure and economic growth was indeed robust for their sample of 23 OECD countries. Their findings are consistent with the hypothesis that most developed countries have levels of government

spending which are above the optimal one. The robustness test performed in the study provided evidence that this relationship is not just an artifact of the data (Fölster and Henrekson 1999, 2001).

More evidence regarding the negative relationship between government size and economic growth is provided by Peden and Bradley (1989). In that study, it is argued a substantial proportion of the slowdown in productivity and economic growth during the 1970s and 1980s was due to the increase in government size during these years. Peden and Bradley used a regression which controlled for the business cycle to estimate the relationship between government size and economic growth. They found the effect of government size on economic growth is negative and statistically significant. Moreover, they concluded the reason economic growth is slowed by larger governments is due to a negative effect on productivity rather than on the employment of productive factors.

A significant negative relationship between government spending and economic growth was also found by Engen and Skinner (1992). In order to assert this relationship, the authors first developed a general model for the relationship between fiscal policy and economic growth. Their model included the following elements:

1. Effect of public spending on private productivity,
2. Returns to scale,
3. A transition from equilibrium growth, and;
4. Tax distortions.

Regression models were estimated using annual data from 107 countries for the period 1970-1985. Moreover, the regression model was corrected to take into

account endogeneity in fiscal policy (i.e. economic growth could have an impact on government expenditure and thus the error terms could be correlated with the independent variables). Findings from this model suggest balanced-budget increases in government spending and tax revenues would be correlated to a decrease in economic growth. These findings are consistent with other literature in which a significant negative relationship between government spending and economic growth is observed. Furthermore, the fact that endogeneity was taken in account in the estimation of the model provides further evidence that the observed relationship is not an artifact due to model misspecifications (Engen and Skinner, 1992).

Mitchell (2005) argued that high government spending is detrimental for economic growth. In order to show this, a comparison between the US and the 15 EU nations was performed. Mitchell showed the US outperformed the EU in terms of per capita economic output (by 40% in 2003 with respect to the average for the 15 EU nations), real economic growth (by over 50% in the years 1995-2005), unemployment levels and living standards. Moreover, government spending, tax revenues and government debt were significantly higher for the 15 EU nations. Based on this evidence, Mitchell concluded that government spending is negatively related to economic growth.

Although results from Mitchell (2005) seem to be consistent with the findings regarding the negative relationship between government spending and economic growth, it should be noted that the analysis did not appear to be statistically rigorous. A comparison between the EU nations and the U.S. in terms of government spending and economic growth is not enough to conclude that it is government spending that

causes variations in economic growth, as there are other factors which may affect both variables.

The view that there is a negative relationship between government size and economic growth is not shared by all researchers in the field. For example, the results from Fölster and Henrekson (1999) are challenged by Agell, et al. (1999) on the basis their methodology is theoretically flawed. Agell, et al. argue that when theoretically valid instruments are used to account for endogeneity in the estimation of the economic growth equation, the relationship between growth of the public sector and economic growth become statistically non-significant. Moreover, they suggest that cross-country growth regressions (as those estimated by Fölster and Henrekson) cannot provide reliable estimates about the impact of the public sector on economic growth.

A non-significant relationship between tax policy and economic growth is also reported by Mendoza, Milesi-Ferretti and Asea (1997). In their study, the hypothesis that tax policy is in practice an ineffective instrument to influence economic growth ("Harberger's superneutrality conjecture") is tested. A theoretical framework was developed to support this hypothesis and cross-country regressions were performed in order to test them. Mendoza, et al. found the negative effects of taxes are consistent with negligible effects on economic growth. Moreover, they showed these results were robust to the introduction of independent variables representing other possible factors which could influence economic growth. Atkinson (1995) argues that findings regarding the relationship between government size and economic growth are inconsistent. For example, he suggests research in this area is riddled with the

problem of *causality*. “It may be poor economic performance that leads to high welfare state spending, rather than *vice versa*. Slow growth, or output below trend, may cause reduced employment and hence higher spending on unemployment benefit and other transfers. Alternatively, it may be high income countries can ‘afford’ a more generous social security system. Or it may be that industrialization of the economy leads both to higher living standard and the need for social security” (p.179).

Relationship between Government Spending and Economic Growth at the State and Local Level

Only a few authors have investigated the relationship between government spending and economic growth at the sub-national level. This section presents a review of the literature concerned with that area of research.

Schaltegger and Torgler (2004) evaluated the effect of government spending on economic growth using a sample of state and local governments (cantons) within Switzerland from 1981 through 2001. Their analysis involved using regressions to account for other possible determinants of growth, such as initial GDP (to account for convergence effects), human capital and unemployment (to account for business cycles effects). Canton dummies were also included to account for other differences among the units in the analysis. Results of these regressions show a fairly robust negative impact of government spending on economic growth.

Mofidi and Stone (1990) examined the effect of spending at the state and local level in the US in the 1962-1982 period. They found state and local taxes had a negative effect on economic growth when the revenues from those taxes were spent

on transfer payment programs. They also found, holding taxes constant, government expenditures in infrastructure, health and education have a positive relationship with economic growth. In this sense, their results are similar to the ones obtained by Vedder and Gallaway (1998), who found negative effects of federal government expenditure in transfer payments and no negative effects of expenditure in public health services. Moreover, their finding that infrastructure spending results in positive growth effects appears to be in agreement with Cashin's (1994) conclusions regarding the positive impact of government investment in areas that have positive externalities to the private sector production function. This suggests the fundamentals that govern the relationship between government expenditure and economic growth could be similar as there does not appear to be important differences in the direction of these relationships; generally positive associations for investment spending and negative association for consumption spending.

A similar analysis was carried out in Helms (1985). This study involved panel data at the state and local level and analyzed the effects of tax revenues and different types of government expenditures on economic growth. The findings from this analysis are consistent with those of Mofidi and Stone (1990). First, they found when state and local tax increases are used to fund transfer payments there is a significant negative effect on economic growth. Moreover, Helms showed when increased tax revenues are used to increase government investment in public services, such as transportation infrastructure, education and public health services, a positive effect on economic growth results. Helms suggest this effect might be due to these spending components having a favorable impact on production and location decisions

outweighing the negative effect produced by state and local tax increases. The findings from this study provide further evidence the relationships between different types of government spending and economic growth are similar at the state and local level when compared to the national level.

Holcombe and Lacombe (2004) performed a comparison among several counties in the US, using annual data from 1960 through 1990, to assess the impact of tax rates on economic growth. In order to control for other factors affecting economic growth, such as climate, culture and proximity to markets, they performed a matching procedure for counties based on geographical location. Findings from the study suggest states which increase their income tax rates more than their neighbors experience slower economic growth. Holcombe and Lacombe estimated an average reduction of 3.4% in per capita income in states which increased income taxes. This finding also appears to be consistent with other research at the national level (such as Fölster and Henrekson, 2001) in that an increase in tax revenues is negatively associated with economic growth. It should be noted the study by Holcombe and Lacombe did not take into account the specific government expenditure items in which the increased tax revenues were spent. Therefore, their findings are not necessarily in conflict with the conclusion that some items are positively associated with economic growth. Their findings might be explained by the decisions of policymakers to spend the higher tax revenues on non-productive government items.

Vedder (1993) compared government growth with economic growth at the state level for all 50 US states. In this analysis, it is argued that government spending grew much faster than personal income from 1980 through 1990. He attributed most

of this increase in government spending to excess compensation of public employees (with important differences across states). Vedder argues that from 1980 through 1990, state and local employees received compensation that was $47.3 billion more than if they had performed similar jobs in the private sector. Moreover, this phenomenon was widespread as excess compensation to state and local employees was observed in all but two of the analyzed states.

A regression analysis performed in Vedder (1993) using data for those 50 states revealed, all else held constant, a one percentage point increase in the proportion of a state's per capita income going to public employee compensation was associated with a decrease of six percentage points in per capita income of that state. Vedder concluded that excess compensation to public employees during the 1980-1990 period had reduced personal income by $280 billion in 1990.

The relationship between different types of government spending and economic growth at the state level was further assessed by Vedder (1993). In this analysis, some findings are in contrast with those obtained by Mofidi and Stone (1990) and Helms (1985). Specifically, results from one regression analysis showed no significant relationship between spending in education and economic growth. On the other hand, government spending in public assistance (transfer payments) was found to have a negative relationship with economic growth, which is indeed consistent with the findings from those studies.

Relationship between Spending Mix and Economic Growth

Although most of the prior research about the relationship between government spending and economic growth focused on aggregate government

spending, there has been some research specific to the effects of different components of government spending (health, defense, etc.) on economic growth. This section presents literature in which these relationships have been assessed.

Vedder and Gallaway (1998) conducted an analysis related to the existence of an Armey Curve for individual components of federal spending in the US. This estimation was completed using the same procedure as the one used for total government spending (described in the previous section). The only difference was the inclusion of individual components of government spending as the independent variables in the linear regression model rather than the measure of total government spending. Results of their analysis show the existence of an Armey Curve is not stable across all government spending items. The following table shows a summary of their findings:

Exhibit 1

Category of Spending	Persistent Negative Spending-Growth Relationship	Armey Curve
All Entitlements (Income Security + Health + Social Sec. + Medicare)	Yes	Yes
Income Security	No	Yes
Health	No	No
Defense	No	No
Net Interest Payments	Yes	Yes
Other Federal Spending	No	No

[For a more detailed discussion on these findings, see Vedder and Gallaway (1998), p. 10]

Vedder and Gallaway (1998) also found, for the items which exhibited an Armey Curve in their relationship with economic growth, government spending to be

above its optimal level in the US. As a result, they recommended stopping the growth of transfer payments relative to income and output. Moreover, they recommended maintaining a balanced budget to help reduce net interest payments (which exhibit an Armey Curve) and thus boost economic growth.

The relationship between different types of government expenditure and economic growth was also investigated in Cashin (1994). In this study, the author began by defining an endogenous growth model which took into account the stock of public and private capital in order to model the production function. This approach is slightly different from the one used in other articles shown in this review of literature because the *stock* of public capital, rather than the *flow* of government expenditure, was assumed as one of the determinants of economic growth.

The implications from the Cashin (1994) model were tested among a sample of 23 developed countries using annual data from 1971 through 1988. As in Engen and Skinner (1992), the potential endogeneity between the economic growth variable and government expenditure and taxation was properly accounted for through the use of instrumental variables. Findings from this study suggest increased government spending on items which contribute to the private production functions (such as public investment) have a positive impact on economic growth. Cashin argued this is due to the positive externalities generated by this type of expenditure increasing private investment and stimulating economic growth. However, findings from that study also suggest this increase would be limited by the need to levy distortionary taxes which were shown to have a negative impact on economic growth. According to the model, the increase in private investment is limited due to a reduction in the

marginal return to private capital caused by the distortionary taxes. With low tax rates, the positive effects of government spending on economic growth outweigh the negative effects of levying distortionary taxes. Therefore, an important conclusion from Cashin's work is that there is a trade-off involved in choosing the level of government expenditure for any spending component. This trade-off underscores the assumption of an Armey Curve for government expenditure items which can have a positive effect on economic growth.

Hansson and Henrekson (1994) also investigated the relationship between different types of government spending and economic growth. Specifically, they used regression models with disaggregated data to estimate the relationship between different kinds of government expenditure and productivity in the private sector (rather than its relationship with economic growth). Findings from this study suggest government transfers, consumption and total expenditure have consistently negative effects, but that education spending has positive effects on private sector productivity. Moreover, they found government investment (such as spending in infrastructure) is not significantly related to private productivity growth. The observation that government transfers were found to have a negative effect on productivity growth is consistent with that of Vedder and Gallaway (1998), who showed this kind of government expenditure is above its optimal level and that spending reductions in this item would be associated to higher economic growth.

Findings from Hansson and Henrekson (1994) suggest the impact of government spending is through changes in total factor productivity. Their results are consistent with those of Peden and Bradley (1989) who suggest the slowdown in

economic growth associated with increased government spending is due to reductions in productivity. It is also worthwhile noting that Hansson and Henrekson's results regarding the impact of government investment appear to be somewhat in disagreement with those of Cashin (1994), as the latter found a positive impact of government investment on economic growth. This difference might be due to the different methodologies employed in these two analyses.

Generally Accepted Growth Determinants and Convergence

While much of the discussion thus far has focused on government spending as a detriment to economic growth, it must be acknowledged that government spending can also have positive effects on economic development. Academic literature points to many commonly accepted "growth determinants" or components of spending that stimulate growth. Some of these factors are more institutional in nature, such as government stability, maintenance of the rule of law, increases in political rights, openness to trade and maintenance of infrastructure. Other factors involve more human elements, such as health and longer life expectancy, lower fertility rates and skill development. Researchers have reached somewhat of a consensus on the economic benefits of two broadly defined categories, human capital and physical capital.

Many scholars, including the much cited Robert Barro, conclude that growth is negatively associated to the government share of consumption in GDP, but positively related to some level of educational attainment - often that of males in secondary education (Barro, 1998). This finding suggests that initial dollars spent on human capital development can have a positive effect on economic growth up to

some level, but are then subject to diminishing returns. An OECD (2002) publication contends there is sufficient evidence expenditures on education pay off due to gains in economic as well as non-economic benefits. The report states that, "It has become clear that educational attainment is not only vital to the economic well-being of individuals but also for that of nations. Access to and completion of education is a key determinant in the accumulation of human capital and economic growth" (p.5).

Data from the Institute for Higher Education Policy (IHEP) suggests states which spend money on programs to send more citizens to college reap many economic benefits. These benefits include increased tax revenues (as college educated citizens tend to earn higher wages), increased productivity, work force flexibility, lower levels of unemployment and a decreased dependence on government financial support. For example, workers in Arkansas with a bachelor's degree earn an average of 147 percent more ($53,646 versus $21,719) than those with only a high school diploma. Similar results can be found in Pennsylvania (109%), Arizona (112%), South Carolina (113%) and New Mexico (132%) (IHEP, 2005).

Furthermore, it is argued that a better educated populace leads to direct societal benefits, including reduced crime rates and increased civic involvement. The study also states indirect benefits, including the claim that healthier constituencies aid state economies by reducing healthcare costs and the number of uninsured. For example, 93 percent of those with a college education reported being in "excellent, very good or good" health, while only 82 percent of high school diploma holders responded that they were in "excellent, very good or good" health (IHEAP 2005). Much research asserts that at least some level of educational investment produces

direct economic benefits and indirectly creates a number of positive externalities. Thus, investment in human capital is a generally accepted determinant of economic growth.

There is also a significant amount of research which supports the idea that public investment in "physical capital" (i.e. infrastructure, etc.) has a net positive effect on economic development. In addition to the research mentioned heretofore, D.A. Aschauer (1988) demonstrats that there is a positive correlation between public physical capital investment and private sector output. He maintains that the decline in American productivity during the 1970s was caused by a failure to maintain high enough rates of public investment. Munnell (1990a; 1990b) and others have continued Aschauer's work (1988) and have demonstrated that public capital investment significantly influences private sector activity and stimulates economic growth. Together, these articles are known as the "Public Capital Hypothesis".

This hypothesis is not without any critics. A study by Bangqiao Jiang (2001) on the relationship between transport infrastructure investments and economic growth in the United States and Canada questions whether the conclusions reached by Aschauer et al. are due to a direct real causation or whether they are the result of a spurious correlation. Jiang (2001) asserts that the Public Capital Hypothesis overstated the degree to which public infrastructure investment stimulated the private sector and the economy. In his conclusion, Jiang (2001) admits it is possible that his critique could be explained by the difficulty to measure the benefits of infrastructure development precisely and calls for more study on the subject.

Nonetheless, conventional wisdom is that some level of physical capital investment is a necessary condition for development. Naturally, states which have underdeveloped infrastructures would be expected to see a higher return on initial physical capital investment. While this study lends much time to the examination of reducing public spending to encourage economic growth, it also acknowledges investments in human and physical capital can stimulate the economy in a variety of ways and are largely considered critical determinants of growth.

Many researchers have studied the determinants of growth to gain an understanding into the causes of economic output differences across countries and even across different locales within a single country. Data in some cases suggests these differences in economic output are becoming less distinct. Economic convergence, as measured by income differences, is occurring among countries throughout the globe - especially between developed countries and select regions. It is also occurring among select areas within the US. Convergence data is of relevance to this study because it underscores the need to discover a unique state and local government spending optimal rather than rely on a less precise aggregate measure.

A study by Bauer, Schweitzer and Shane (2006) is especially relevant to the present study as it examines differences among states within the US. Bauer, et al., showed that income differences across states had been narrowing during the period from 1939 through 1976; the ratio of income per capita of the richest state to the poorest state was 4.5 in 1939 and slightly less than 2 in 1976. However, since 1976 the ratio has begun growing once again. In order to explain these differences, Bauer, et al. developed and tested a growth model based on Solow's standard model but

included other factors which could cause differences in the productivity of labor, such as tax burdens and public infrastructure. They found the main factor explaining a state's relative income per capita is its "knowledge stock," which was defined as its stock of patents as well as high school and college attainment rates.

Barro and Sala-i-Martin (1991) investigated income convergence among states in the US from 1880. They examined the dispersion of personal income since 1880 and related it to the patterns of individual states and to the behaviors of regions as a whole. Moreover, the evolution of state level economic output since 1963 was examined and related to productivity in eight major sectors. Results of this study show there has been convergence for both sector and state aggregates. In particular, the convergence rate observed was between 2% to 2.5% per year.

Convergence across states in the US was also examined by Higgins, Levy and Young (2006). In this study, US output data at the county level was examined. Higgins, et al. used both ordinary linear regression and three-stage linear regression with instrumental variables to assess convergence across states, controlling for a number of variables assumed to be determinants of convergence and growth. Analysis of this data produced several observations: (a) positive convergence rates between 2% and 8% per year (depending on the regression method used); (b) convergence rates differed by region (the rate of convergence for Southern states was much higher than that of Northeastern states); (c) all levels of government (federal, state and local) were negatively correlated with economic growth (in agreement with the findings of other studies related to the US being in the "bad" side of the Armey Curve), and; (d) development of the finance, insurance, real estate and entertainment sectors were

positively correlated with growth, while education employment was negatively correlated with growth.

Caselli and Coleman (2001) conducted a study of the structural transformation within the US (such as transitioning from an agrarian society to an industrial one) and regional convergence (such as an eroding differential between southern and northern average wage). They found that regional convergence is best explained by "structural transformation," which was defined as the process by which agricultural wages converged to nonagricultural wages and also by the rate of transition from agricultural to nonagricultural jobs, which was significantly higher within the Southern labor force. Caselli and Coleman found the extent to which economic output in states in the Midwest converged to those of states in the Northeast could be ascribed to those same factors. Caselli and Coleman claim their model accounts for regional convergence as well as any other explanation.

Grier and Grier (2007) made a counterintuitive finding regarding convergence in economic output across countries. According to the neoclassical model, divergence in economic output levels should only be observed if determinants of steady-state output are also divergent. However, Grier and Grier found that accumulation rates of capital (both human and physical), openness to trade and institutional quality (each steady-state determinants which are policy dependant) are significantly converging across time. They conclude that this constitutes an anomaly in the neoclassical growth model and casts doubts on its validity to explain economic growth. However, Grier and Grier offered some potential explanations for these findings to exist within the

neoclassical growth model, such as lengthy time lags required for convergent policies to affect steady-state incomes and the existence of scale effects.

Notwithstanding the literature suggesting economic convergence between the US states, substantial differences still exits. As indicated by Grier, much time will be required before complete convergence can be realized, if it can be at all. Per capita personal income in 2007 ranges from Connecticut's high of $54,117 to Mississippi's low of $26,845, with a US average of $38,611. Latest Census data shows that in 2006, the percentage of the population age 25 and older who graduated from high school ranges from 93 percent in Minnesota to 79 percent in Texas. Percentages of the population age 25 and older with a bachelor's degree or higher range from a high of 49 percent in Massachusetts to a low of 16 percent in West Virginia. These disparities are a motivating factor behind the present investigation into a state-specific optimal level of public spending.

Summary

In this section, prior findings on the relationship between government spending and economic growth were presented. Research does not indicate a definitive impact of government spending on economic growth. While many researchers have found negative correlations (both at the national and state levels), other authors have challenged the validity of the methods used in order to arrive at those conclusions. Research also indicates that the *effect* of government spending might depend on the *type* of spending. Findings regarding the impact of transfer payments have shown a consistently negative relationship between these expenditures

and economic growth; while other types of expenditure, such as public investment, have not shown the same negative correlation.

The following chapter presents the methods used in the present study to assess the existence of an Armey Curve at the state and local level in the US.

Chapter III

Methodology

In this chapter, the data collection and analysis methods used to address the aims of the present study are presented. The objective of this study is to determine (a) the relationship between government spending and real economic growth at the state and local level and (b) the government spending level for each state which maximizes growth in economic output. To address this objective, state and local level data on government spending and economic growth is required and multiple linear regressions must be computed individually for each state.

Setting

The present study is limited to states and locales within the United States during the period from 1976 through 2005 due to consistency and attainability of data between said period. Study variables which have missing data, namely GSP in years 2001 and 2003, are interpolated for the analysis.

Research Questions

Based on the objectives of the present study, the following research questions are defined:

1. What is the relationship between government spending and economic growth at the state level in the United States?
2. Does the relationship between government spending and economic growth follow an Armey Curve for the US states?

3. What are the optimal state and local government spending rates (as a proportion of the corresponding area's economic output) for each state?
4. Does the model developed by Vedder and Gallaway for finding public spending optimums on the federal level transfer well to the sub-federal level?

Data Collection

Data is obtained from the following sources:

- Bureau of the Census
- Bureau of Labor Statistics
- Bureau of Economic Analysis
- US Department of Education
- National Center for Educational Statistics
- National Governor's Association

These sources provide cross-sectional and time-series data on sub-federal economic output, unemployment and government spending components such as education services, social services, income maintenance, health, transportation, public safety and net interest payments. The main data set is from the Bureau of the Census.

Definition of Independent and Dependent Variables

This study assesses the relationship between government spending and real economic output growth. Following the procedure outlined in Vedder and Gallaway (1998), this relationship is controlled for a time trend and the unemployment rate. Moreover, following Vedder and Gallaway, "government spending" is defined alternatively as total government expenditure and as the following components of spending: (a) current expenditure, (b) capital expenditure, (c) total education expenditure, (d) secondary education expenditure, (e) higher education expenditure, (f) public welfare expenditure, (g) general finance and administration expenditure, (h) public health expenditure, (i) infrastructure expenditure, (j) public safety expenditure and (k) net interest expenditure. Therefore, the following variables are used in the present study:

Dependent Variable:

- *Economic Output Growth*. This is defined as the yearly percent change in the gross state product (GSP) per capita, adjusted for the effect of inflation, for each state under analysis.

Independent Variables

- *Government Spending.* This is defined alternatively as:
    - Total state and local government spending as a proportion of the corresponding state GSP.
    - State and local current account (consumption) spending as a proportion of the corresponding state GSP.

- State and local capital account (investment) spending as a proportion of the corresponding state GSP.
- State and local total education spending as a proportion of the corresponding state GSP.
- State and local secondary education spending as a proportion of the corresponding state GSP.
- State and local higher education spending as a proportion of the corresponding state GSP.
- State and local public welfare spending as a proportion of the corresponding state GSP.
- State and local general finance and administrative spending as a proportion of the corresponding state GSP.
- State and local public health spending as a proportion of the corresponding state GSP.
- State and local infrastructure spending as a proportion of the corresponding state GSP.
- State and local public safety (police, fire, corrections) spending as a proportion of the corresponding state GSP.
- State and local net interest spending as a proportion of the corresponding state GSP

- *Time trend*. This variable takes on the value of one for the first year of data for each state and increases by one for each year thereafter. The rationale for including this independent variable is to allow economic

growth to follow a time trend (i.e. allow for the possibility that state economic growth is accelerating or decelerating over time).

- *Unemployment Rate*. This variable is defined as the proportion of unemployed labor force for the corresponding state.

Data Analysis

In order to address Research Questions 1 and 2, multiple linear regression analysis is performed. As mentioned previously, the ordinary least squares regression model used for the present study is based on that of Vedder and Gallaway (1998). Thus, the regression model used for this study is the following:

$$O = a + bG - cG^2 + dT - eU$$

where O is total real output per capita, G is government spending (as a percentage of economic output), T is the time trend and U is the unemployment level. Variables T and U are included to control for the upward trend in output (due to changes in technology, human capital, etc.) and for variations due to the business cycle. The relationship between government spending and output is given by coefficients b and c.

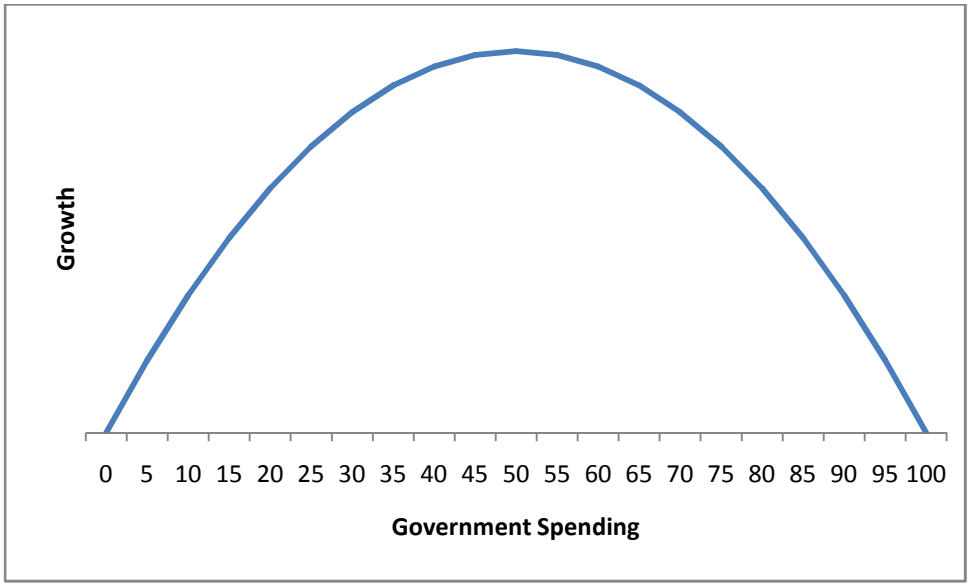
The reason why a squared term is included in this regression model is to allow for the existence of an Armey Curve in the relationship between government spending and economic growth. If the squared term were omitted, the model would "force" the relationship between government spending and economic output growth to be linear, which would imply that economic growth is a strictly increasing or strictly decreasing function of government spending. Clearly, this contradicts the idea

of the Armey Curve, which suggests the relationship between government spending and economic output growth is nonlinear.

According to Armey Curve arguments, economic growth should be an increasing function of government spending for "low" levels of this variable and a decreasing function of government spending for "high" levels of this variable. In the described regression model, an Armey Curve would be evidenced by a *negative and significant* regression coefficient *c*. This would imply that economic growth as a function of government spending resembles a concave second-degree polynomial, as presented in Figure 1.

Relationship between Government Spending and Economic Growth assuming an Armey Curve

Figure 1



Results from this regression model allow for determining the nature of the relationship between government spending and economic growth (as given by

coefficients *b* and *c*) and testing the existence of an Armey Curve, which would be confirmed by a negative and significant *c* coefficient.

In order to find optimal government spending, which is defined as the government spending rate that maximizes economic growth, the following formula is used:

$$\text{Optimal Spending} = -\frac{b}{2c},$$

the standard analytical formula representing the argument that maximizes the value of a concave second-degree polynomial (i.e. finds the value of the vertex).

Given the main objective of the present study is to test the relationship between government spending and economic growth for each state (as this may allow for different growth-maximizing government spending rates), the aforementioned regression model is estimated separately for each state. This requires that multiple regressions be estimated. To streamline the estimation of these models, a custom application designed for Matlab R14 is utilized. The application is designed where the regressions are automatically estimated so that the results include regression coefficients for all independent variables, as well as their associated significance values, for each state.

This procedure is repeated using the different aforementioned definitions of "government spending," which results in a total of 12 sets of estimations (one for total government spending and one for each of the spending components).

Summary

This chapter presented the data collection and analysis methods performed to determine: (a) the relationship between government spending and economic growth at

the state level (does it follow an Armey Curve?) and (b) the government spending level for each state that maximizes economic output growth for that area. In order to assess these questions, multiple linear regressions based on the model outlined by Vedder and Gallaway (1998) are estimated for each state.

Chapter IV

Results

The objective of the present study is to examine the relationship between government expenditure and economic growth as measured by real gross state product (GSP) per capita. In order to examine this relationship, multiple linear regression analyses are conducted. One separate regression is run for each state and then for the US as a whole (thus 51 "states"), using data on state and local level expenditures from 1976 through 2005. The main aim of this procedure is to determine whether there is an Armey Curve for each state (or for the US as a whole). For the cases in which there is an Armey Curve, the optimal level of expenditure is computed and compared to the level of expenditure as of 2005 to determine whether the state government is oversized or undersized.

As discussed in the previous chapter, the regression analyses are modeled after Vedder and Gallaway (1998) where each regression includes yearly data of only one state (or the US aggregate). The dependent variable is real GSP per capita. The independent variables are:

- State expenditure / GSP ratio (a linear and a quadratic term for this variable were included)
- Unemployment Rate
- Linear trend or Time

Moreover, different measures of state expenditure are used in each regression. Therefore, for each state and for the US aggregate, a total of 12 regressions are run. The following 12 measures of state expenditure are used: (a) total expenditure, (b) current expenditure, (c) capital expenditures, (d) total education expenditure, (e) secondary education expenditure, (f) higher education expenditure, (g) public welfare education, (h) financial administration expenditure, (i) public health expenditure, (j) total highway expenditure, (k) public safety expenditure and (l) interest expenditure. Results of all regressions are presented in the Appendix. To prevent potential heteroskedasticity problems, robust standard error estimates are computed for all regressions. These are computed using White's (1980) formulas for the estimate variance-covariance matrix. The results are discussed in the following sections.

Relationship between State Level Expenditure and Output (1976-2005)

Results for Total Expenditure

Table 1 in the Appendix presents the results of regressions conducted using total expenditure as the independent variable. Following Vedder and Gallaway (1998), an Armey Curve is assumed to exist if the coefficient of the quadratic term for total expenditure is *negative* and *significantly different from zero* (a .05 significance level is used). As discussed in the previous chapter, a negative and significant coefficient for this quadratic term would imply the relationship between the expenditure and GSP resembles a “concave parabola,” which in turn would suggest there is indeed a level of expenditure that maximizes economic output. If the quadratic term is not significant, this would imply a linear relationship between the expenditure and GSP where the “optimal” expenditure level would be either 0% or

100% of GSP (depending on whether the linear term is positive or negative). For cases in which an Armey Curve is found, the optimal level of expenditure is computed. This is based on the standard formula for the maximum of a concave parabola, which is $-b/2a$, where b is the coefficient for the linear term and a is the coefficient for the quadratic term.

As can be seen from the results in Table 1, only two out of the 51 "states" exhibit an Armey Curve based on total expenditure: CT and LA. It is noteworthy the level of expenditure in CT as of 2005 is very close to the optimal level of expenditure for that state (15.41% optimal vs. 15.32% expenditure in 2005). In contrast, the level of expenditure in LA in 2005 (18.06%) is approximately 4 percentage points above the estimated optimal level (13.99%).

None of the other states or the US aggregate shows an Armey Curve for the relationship between total state expenditure and real GSP per capita.

Results for Current Expenditure

As can be gleaned from the results in Table 2, only three out of the 51 "states" exhibit an Armey Curve based on current expenditure: CT, HI and LA. In all three cases, the level of expenditure as of 2005 is higher than the estimated optimal level of expenditure and ranges from 12.47% to 14.29% among these three states. None of the other states or the US aggregate shows an Armey Curve for the relationship between current expenditure and real GSP per capita.

Results for Capital Outlays

As can be seen from the results in Table 3, none of the 50 states or the US aggregate exhibits an Armey Curve based on capital outlays.

Results for Total Education Expenditure

As can be gleaned from the results in Table 4, only two out of the 51 "states" exhibit an Armey Curve based on total education expenditure: LA and NV. In both cases, the level of expenditure as of 2005 is higher than the estimated optimal level of expenditure (in LA, the actual level is 4.98% whereas the optimal level is 3.75%; while in NV the actual level is 4.07%, whereas the optimal level is 3.65%). None of the other states or the US aggregate shows an Armey Curve for the relationship between total education expenditure and real GSP per capita.

Results for Secondary Education Expenditure

As can be seen from the results in Table 5, only one out of the 51 "states" exhibits an Armey Curve based on secondary education expenditure (LA). The actual level of secondary education expenditure in 2005 (3.26%) is higher than the estimated optimal level (2.68%). None of the other states or the US aggregate shows an Armey Curve for the relationship between secondary education expenditure and real GSP per capita.

Results for Higher Education Expenditure

As can be gleaned from the results in Table 6, four out of the 51 "states" exhibit an Armey Curve based on higher education expenditure (CA, LA, NJ, and NV). The actual level of higher education expenditure in 2005 is higher than the estimated optimal level for three of these four states (in CA, however, the actual expenditure is lower than the estimated optimal expenditure). None of the other states

or the US aggregate shows an Armey Curve for the relationship between higher education expenditure and real GSP per capita.

Results for Public Welfare Expenditure

As can be seen from the results in Table 7, three out of the 51 "states" exhibit an Armey Curve based on public welfare (DC, HI, and IL). The actual level of public welfare expenditure in 2005 is higher than the estimated optimal level for these three states. The state with the largest gap between optimal and actual expenditure is HI (1.67% optimal vs. 2.63% actual). None of the other states or the US aggregate shows an Armey Curve for the relationship between public welfare expenditure and real GSP per capita.

Results for Financial Administration Expenditure

As can be gleaned from the results in Table 8, six out of the 51 "states" exhibit an Armey Curve based on financial administration expenditure (CO, FL, MN, NC, TX and WA). The actual level of financial administration expenditure in 2005 is lower than the estimated optimal level for these six states, suggesting an increase in this type of expenditure would impact positively the economic output. None of the other states or the US aggregate shows an Armey Curve for the relationship between financial administration expenditure and real GSP per capita.

Results for Public Health Expenditure

As can be seen from the results in Table 9, two out of the 51 "states" exhibit an Armey Curve based on health and hospital expenditure (CT and HI). The actual level of health and hospital expenditure in 2005 is lower than the estimated optimal level for CT (0.91% actual vs. 0.97% optimal), but is higher than the estimated

optimal level in HI (1.52% actual vs. 1.25% optimal). None of the other states or the US aggregate shows an Armey Curve for the relationship between public health expenditure and real GSP per capita.

Results for Total Highway Expenditure

As can be gleaned from the results in Table 10, only one out of the 51 "states" exhibits an Armey Curve based on total highway expenditure (NV). The actual level of total highway expenditure in 2005 is higher than the estimated optimal level (1.41% actual vs. 1.36% optimal). None of the other states or the US aggregate shows an Armey Curve for the relationship between highway expenditure and real GSP per capita.

Results for Public Safety Expenditure

As can be seen from the results in Table 11, three out of the 51 "states" exhibit an Armey Curve based on police, fire, and corrections expenditure (HI, LA and VA). The actual level of public safety expenditure in 2005 is higher than the estimated optimal level for all three states. It is noteworthy that the actual level in LA is more than twice its optimal level. None of the other states or the US aggregate shows an Armey Curve for the relationship between police, fire, and corrections expenditure and real GSP per capita.

Results for Interest Expenditure

As can be gleaned from the results in Table 12, only one out of the 51 "states" exhibits an Armey Curve based on interest expenditure (CA). The actual level of interest expenditure in 2005 is higher than the estimated optimal level for this state (0.76% actual vs. 0.54% optimal). None of the other states or the US aggregate shows

an Armey Curve for the relationship between interest expenditure and real GSP per capita.

Summary of Regressions Based on 1976-2005 Data

As can be seen from the previously discussed results, no consistent Armey Curves are found for the US in aggregate, individually or for any of the 12 examined components of state expenditure. Moreover, a very small percentage of the states are found to have significant Armey Curves for this period. However, the results show that in most of the cases in which an Armey Curve is indeed found, the actual spending level tends to be higher than the estimated optimal level.

Since these results seem to contradict the findings of Vedder and Gallaway (1998), where a significant Armey Curve was found for US aggregate state and local level expenditure, it is hypothesized this difference may be due to the use of a different time period (Vedder examined the 1952-1993 period, whereas this study examines the 1976-2005 period). So, the regressions are re-estimated using shorter periods of time (i.e., cutting the sample at 2004, 2003, 2002, etc.) until a significant Armey Curve for the US aggregate is found. After considering several sub-samples, a significant Armey Curve is found for the US aggregate using data for the 1976-2000 period. The results of these analyses are presented in the following section.

Relationship between State Level Expenditure and Output (1976-2000)

Results for the regressions based on the 1976-2000 period are presented in Tables 13 through 24. As can be gleaned from Table 13, a significant Armey Curve for total expenditure is found using US aggregate data for this period. Consistent with Vedder and Gallaway (1998), it is found that the actual state and local level spending

in the US (19.18% as of 2005) is higher than the estimated optimal level (16.74%). Therefore, a decrease in total expenditure could potentially result in a higher economic output. Similarly, as can be gleaned from Table 14, a significant Armey Curve for current expenditure is found for the US. Moreover, the actual spending level as of 2005 (16.94%) is higher than the estimated optimal level (14.61%), which is consistent with the previous results. However, only one significant Armey Curve is found for the US for any of the other expenditure types. As can be seen in Table 19, a significant Armey Curve is found for the US based on public welfare. Consistent with previous results, the actual spending level in 2005 (2.93%) is higher than the estimated optimal (2.05%).

Another noticeable feature from Tables 13 and 24 is that very few of the individual states exhibit an Armey Curve using data from the 1976-2000 period for any of the 12 examined expenditure components. However, consistent with the results from the 1976-2005 period, the actual spending level tends to be higher than the estimated optimal level for the states in which a significant Armey Curve is found.

Chapter V

Conclusions and Discussion

The main purpose of this study is to examine the relationship between government spending and economic growth. More specifically, this study examines government spending on state and local levels at it relates to gross state product (GSP). The analysis determines for each state whether there exists an Armey Curve that represents a possible level of optimal spending. Subsequently, if an Armey Curve is identified, an optimal level of spending is determined and compared to the current level of spending. Additionally, different components of government spending are evaluated in a similar manner. The purpose of this chapter is to provide discussion of the results within the framework of the literature review.

This chapter starts with an overview of the extensive literature that addresses the relationship between government spending and economic growth on national levels. This helps to establish a framework for the subsequent overview of the more scarce literature on the relationship between government spending and economic growth at the state level. Second, different types of government spending are discussed on a state level to determine the aforementioned relationship. Third, conclusions are drawn with respect to whether each state, and specific types of government spending within that state, exhibits an Armey Curve. Finally, the significance and limitations as well as suggestions for future research are presented.

The Effect of Government Spending on Economic Growth

As indicated, this section provides an overview of past research addressing the relationship between government spending and economic growth on both national and state levels. The majority of research concludes there is a negative relationship between government spending and economic growth on a national level. However, there have been extensive debates with respect to the nature of the different models used to evaluate this relationship.

Vedder and Gallaway's research and methodology serves as the model for this study. Vedder and Gallaway (1998) found the Armey Curve to exist on both a national and state level in the United States and ascertained that government spending is higher than the optimal level. From this, they concluded that a decrease in government spending would be beneficial in producing economic growth. Vedder and Gallaway also confirmed this finding among other industrialized countries. Vreyman and Verhulst (2005) found a similar result with respect to the negative influence of government spending on economic growth in their analysis of growth differentials in European countries. These researchers referred to countries exhibiting this negative relationship as being on the "bad" side of the Armey Curve. Barro (1990) also observed similar results where government spending as a proportion of GDP is negatively related to economic growth. It is important to note that Barro was a pioneer in establishing multiple regression methodology as a standard for much of the research based on this topic.

Grier and Tullock (1989) employed a methodology similar to Barro and concluded there is a fairly robust negative correlation between government

consumption and economic growth. However, a crucial finding in this research is that the data from their study countries did not share a similar set of coefficients for the independent variables (i.e. government spending). This helped confirm the theory that there is not a single level of government spending in proportion to economic output that is optimal for all economies, leaving open the possibility a state could potentially benefit from an increase in government spending.

This finding introduces the *other side* of the Armey Curve. Armey (1995) suggested governments which do not spend sufficiently can lack the laws, investment and infrastructure necessary to foster a high level of productivity in their respective countries. In such a case, a country would exhibit a positive relationship between government spending and economic growth in that they could benefit from spending more on these components. A negative relationship between government spending and economic growth has been commonly observed in much of the literature because the countries examined had already approached the point of diminishing returns beyond the optimal government spending level where marginal benefits equal marginal costs.

This study is more concerned with the relationship between government spending on a sub-federal level and economic growth. Having reviewed the framework of this concept on the national level, a discussion of the less extensive literature on a state and local level provides the foundation for evaluating the results of this study. Keep in mind the United States is a country identified as residing on the "bad" side of the Armey Curve. Given this identification, and holding all else

constant, a reduction in spending should increase economic growth while an increase in spending should reduce economic growth

Schaltegger and Torgler (2004) examined the effect of government spending on economic growth using a sample of state and local governments within Switzerland. Their analysis included regressions which took into account other possible determinants of growth, namely convergence effects and business cycle effects. It is interesting to note the regression model applied in the current study takes into account business cycle effects but not possible convergence effects. The results of Schaltegger and Torgler's regressions revealed a fairly robust negative influence of government spending on economic growth.

Mofidi and Stone (1990) studied the effects of government spending at state and local levels within the United Sates from 1962 to 1982. These researchers found that taxes spent on transfer payments have a negative influence on economic growth. They also observed, when holding taxes constant, government expenditures on infrastructure, health and education have a positive effect on economic growth. Helms (1985) found similar results suggesting that tax increases used to fund transfer payments have a significant negative effect on growth. Also, Helms concluded that increases in government spending for transportation infrastructure, education and public health have positive effects on economic growth.

Vedder (1993) conducted a study which compared government spending with economic growth at the state level for all 50 US states. In Vedder's analysis, it was asserted that government spending grew much faster than personal income during the 1980s. More specifically, he attributes this increase in government spending to excess

compensation of public employees. In the regression analysis performed, Vedder observed that a one percentage point increase in the proportion of a state's per capita income going to public employee compensation resulted in a decrease of six percentage points in per capital income for that state. This demonstrated another instance where increases in government consumption spending had a negative effect on economic growth on the state level.

The current research finds mixed results on this topic in that only two states are found to exhibit an Armey Curve using total expenditure data (CT and LA). LA is found to be above the optimal level, showing a negative relationship. CT reports a spending level just below the optimum, indicating it could benefit from a slight increase in government spending. An Armey Curve is not found for the other states, indicating either a positive or negative linear relationship (depending on the sign of the linear term) between overall government spending and economic growth on the state level. These findings are inconclusive and generally do not align with the literature in that Armey Curves are not found to model the relationship between aggregate government spending and economic growth on the state level. Similar findings are found in the present study when current expenditure is evaluated with respect to the relationship between government spending and economic growth on the state level.

The time span used in this analysis could be a factor in the determination of an Armey Curve. For example, in the original calculations of the present study, an Armey Curve for the entire United States is not found when relating aggregate state expenditure to economic growth. To achieve an Armey Curve, the time span taken

into consideration was shortened until an Armey Curve is found for the United States. The modified setting shortened the time span by five years in order to achieve an Armey Curve. These re-estimated results are more in line with Vedder and Gallaway's (1998) finding that state government expenditure has a negative relationship with economic growth. In 2005, total US state and local government expenditure in proportion to GSP was 19.18% while the optimal level found in this analysis is 16.74%. Confirmation of the Armey Curve using the modified time period updates the Vedder and Gallaway benchmark and adds validity to the argument that the association between government size and economic growth depends on elements that change with time. A state and local government expenditure optimum at 16.74% of gross state product compared to an optimum of 11.42% found by Vedder and Gallaway (1998) is significant to a multi-billion dollar state budget and an important contribution of the present study.

These modified results are more consistent with past findings where a negative relationship was observed between state government spending and economic growth. However, the current study found few individual states to exhibit an Armey Curve that models this relationship between government spending and economic growth. This gives credibility to the concept that differing characteristics of a given economy may dictate what level and kind of government spending is optimal for maximizing economic growth. Throughout this study, where Armey Curves are confirmed the associated spending optimal is unique to each state. For example, the public welfare spending optimal for the US (2.05%) is lower than the estimated optimal for NY (3.27%).

Notwithstanding these state-specific outcomes, the research presented shows there are similarities between the state and national level when it comes to the relationship between government spending and economic growth. As can be gleamed from the relatively few spending optimums calculated in the current study, the relationship observed between aggregate state government expenditure and economic growth is largely consistent with past research. However, given that most individual states are not found to exhibit an Armey Curve, results are inconclusive and limit the applicability of the model for the state and local level.

One note of import is that some types of public spending have been found to have a growth-enhancing effect when positive externalities related to that spending are observed with respect to the private sector production function. In other words, while it has been noted in past research that there is a negative relationship between aggregate government spending and economic growth on a national and state level, it has also been observed that some types of government spending exert a positive influence on economic growth. Now that total government spending has been discussed in relation to economic growth, a closer look at individual components of government spending highlights their specific contribution to state level economic growth.

For this study, the spending components are (a) current expenditures, b) capital expenditures, (c) total education expenditure, (d) secondary education expenditure, (e) higher education expenditure, (f) public welfare (g) financial administration expenditure, (h) public health expenditure, (i) total highway expenditure, (j) public safety expenditure and (k) interest expenditure. The results

from the current study are now compared to the previously reported public expenditure effects.

The results of this research are mostly inconsistent with past research with respect to the exhibition of an Armey Curve for specific areas of expenditure. The results show that very few states exhibit an Armey Curve in regard to any of the expenditure categories.

As mentioned earlier, Mofidi and Stone (1990) found state and local taxes had a negative effect on economic growth when these revenues were devoted to transfer payment programs. Helms (1985) observed similar findings with respect to the negative effect of transfer payments. Similar results were found by Vedder and Gallaway (1998) for the national level. In the results of the current study, only three states exhibit an Armey Curve based on public welfare (DC, HI, and IL). In these three states the actual level of spending is higher than the calculated optimal level. This indicates there is a negative relationship between public welfare spending and economic growth on a state level. These findings are consistent with past research when considering only these three states. Overall, the results are not conclusive about the relationship between public welfare expenditure and economic growth since only three states exhibit an Armey Curve for this category.

Helms (1985) and Mofidi and Stone (1990) found government expenditures in education, infrastructure and health have a positive relationship with economic growth. Vedder and Gallaway (1998) found no statistically strong effects, either positive or negative, for expenditure in education or public health on economic

growth. Study results for each of these categories are now discussed with regard to their contribution to economic growth on a state level.

With respect to total education expenditure, the current study found only two states to exhibit an Armey Curve (LA and NV). For both of these states the level of expenditure is higher than the estimated optimal level, indicating a negative relationship. With respect to secondary education expenditure on a state level, the current study found only one state to exhibit an Armey Curve (LA). The level of spending found for LA is higher than the estimated optimal level, again indicating a negative relationship.

With respect to higher education expenditure on the state level, the current study found four states to exhibit an Armey Curve. Three of these states (LA, NV and NJ) have levels of expenditure for higher education which is higher than their estimated optimal level. This indicates a negative relationship between government expenditure on higher education and economic growth on a state level. However, one state that depicts an Armey Curve, CA, has a level of spending which is lower than the estimated optimal level. This indicates CA could benefit from more expenditure in this area. This is a finding in the current study which is consistent with past research in that a positive relationship is found between expenditure on education and economic growth. Overall however, the results for education expenditure do not align with those of past research that found a positive relationship. In fact, Barro (1990) specifically asserts that expenditure in education could enhance economic growth.

This study depends on highway transportation spending to gauge the relationship between state government expenditure in infrastructure and economic

growth. With respect to state expenditure on highways, only one state exhibits an Armey Curve (NV). The actual level of highway spending in this case is higher than the estimated optimal level. This indicates a negative relationship between highway expenditure and economic growth on the state level. This finding is not consistent with Helms (1985) and Modfidi and Stone (1990) who found state expenditure on infrastructure to be positively related to economic growth.

The current study also evaluates the relationship between state expenditure on public health and economic growth. The findings reveal only two states exhibit an Armey Curve (CT and HI). For HI, the level of expenditure on health is higher than the estimated optimal level, indicating a negative relationship. This finding is not consistent with the past research which found a positive relationship. On the other hand, CT has a level of expenditure on public health below the optimal level. This indicates a positive relationship and a consistency with past research from Helms (1985) and Mofidi and Stone (1990). These findings are also consistent with Vedder and Gallaway's (1998) findings that expenditure on health did not exhibit an Armey Curve (only two states do in the current study).

The present study evaluates the relationship between state expenditure on financial administration and economic growth. This category contains expenditures related to tax assessment and collection, accounting, auditing, budgeting, purchasing, custodial funds, judicial and legal services, executive administration and central staff services. Six states (CO, FL, MN, NC, TX and WA) are found to exhibit Armey Curves and each of these states have levels of spending on financial administration that is lower than the estimated optimal levels. This indicates there is a positive

relationship between expenditure on financial administration and economic growth. This finding is interesting not only because more states are found to have Armey Curves than in the other expenditure categories, but also because a positive relationship is found for each state. This suggests that not enough money is being spent on financial administration at the state level.

This study also evaluates the effect of state public safety expenditure on economic growth. The results show only three states have an Armey Curve (HI, LA and VA). Also, the level of expenditure on police, fire and corrections in these states is higher than the estimated optimal level, indicating a negative relationship. This suggests, from an economic growth perspective, too much is spent on public safety in these states.

The present study evaluates the relationship between state expenditure on interest and economic growth. Only one state (CA) is found to exhibit an Armey Curve. The actual level of expenditure in this category for CA is higher than the estimated optimal level. This finding is consistent with Vedder and Gallway's (1998) research that concluded expenditure on interest exhibited an Armey Curve and had a persistent negative relationship with economic growth.

With respect to current expenditure at the state level, this study finds only three out of the 51 "states" exhibit an Armey Curve (CT, HI and LA). In all three cases, the level of expenditure as of 2005 is higher than the estimated optimal level of expenditure. The last spending category to be discussed is capital outlays. This study finds no states exhibiting an Armey Curve for capital outlays. Thus, it is inconclusive

as to the relationship between state expenditure on capital outlays and economic growth.

The results for each of the specific spending categories are not helpful in the sense that Armey Curves are not found for almost all of the states. However, given past research, it is unlikely the states do not have a relationship between these spending categories and economic growth that resembles an Armey Curve. In other words, it is impossible the optimal level of spending on a state level for any one of the given spending categories is either zero or one hundred percent. Theoretically, there has to exist an optimal level of spending for each state with respect to overall expenditure and to each categorical expenditure. This study failed to consistently identify Armey Curves across a spectrum of spending variables suggesting the Vedder and Galloway model is not perfectly adaptable to the sub-federal level.

For the Armey Curves that are found, the results of this study are generally consistent with past research where public spending is found to have a negative relationship with economic growth. However, some of the spending categories previously observed to have positive relationships with economic growth (education, health and infrastructure) are found to have negative relationships in this study. This discrepancy may be explained, in part, by state-specific characteristics that dictate differing levels of optimal spending among individual economies. For instance, some states may spend more dollars on education relative to other states, yet the quality of instruction and student competencies gained may be inferior to those states that spend fewer dollars, thus the investment does not lead to enhanced economic growth. Likewise, a state may spend a proportionate per capita amount of transportation

dollars relative to other states, but have a disproportionate amount of road miles to maintain such that the infrastructure expenditure is insufficient to expand output. Ultimately, the results from this study are largely consistent with past research in that negative relationships are found between government expenditure and economic growth on a state level. In other words, states within the United States tend to fall on the "bad" side of the Armey Curve.

Implications

To date, there has been limited research on the relationship between government spending and economic growth on the sub-federal level. The findings from this study contribute toward the goal of indentifying an optimal size of state and local government for each of the states within the United States. By testing the Vedder and Galloway (1998) model and confirming its non-transferability to the individual state level, tangible results and valuable information have been gleamed placing researchers one step closer to developing a model conducive to a state-specific optimal. Once a unique optimal level of state and local government spending is determined, then the most efficient levels and distributions of taxation can be determined. Also, equipped with reliable information regarding optimal levels of spending within spending categories, governments could achieve appropriating efficiency. Until further research can be completed and a state-specific model developed, the findings from this study confirm and update the Vedder and Galloway optimal spending benchmark useful to all US states. Guidelines can be established and used by state policymakers to target an economic output-maximizing spending optimum. The present study contributes to this uncultivated field of study and toward

the development of a unique spending optimal for each state. Thus, this study aids policymakers in their efforts to maximize economic output and enhance the quality of life of the citizenry.

Limitations

The present study is limited to the analysis of government spending and economic output in the 50 United States during the period of 1976-2005. The effects of other variables on economic output (other than unemployment) are not considered in this study. Given one underlying assumption of the present analysis is that each state has an associated specific government spending rate, results from the present study are not suitable for other countries.

Another limitation of the present study is that multiple linear regression is used to assess the relationship between government spending and output. It is only possible to draw an association between these variables, but not a relationship of causality. The regression coefficients may be biased since other factors which might influence economic growth, such as countercyclical macro policies, innovation or institutions, are not included.

Finally, it must be noted the “optimal” government spending rate sought is one which maximizes economic output. This definition does not take into account matters of social consciousness and politics. For instance, there is no guarantee of correlation between the maximization of economic output and the maximization of social welfare.

Suggestions for Future Research

There are several suggestions for future research that could enhance the validity of the conclusions found. First, a major difference between the federal and sub-federal level governments in the US is that all but one state, Vermont, has either a statutory or constitutional requirement of a balanced budget. This dictates that when contractions produce revenue shortfalls, states must reduce spending. The states are unique in that they may actually appropriate fewer dollars from one year to the next. This distinguishes state spending from federal spending producing the potential for greater spending volatility. Thus, one possibility is to use five-year averages to smooth the data. Of concern here is the lack of state-specific unemployment data prior to 1976 that limits the number of observations in the current model. Future study should consider the use of national unemployment data or total state employment numbers as a proxy. Second, there are other relevant growth factors which could be incorporated as independent variables and might explain growth differentials to a higher degree. Accordingly, another suggestion is to expand the regression model to take into account more fully state differences in demographics, geography, educational attainment, initial prosperity and taxes. Third, some academic literature suggests that "urban clusters" are growth enhancing. Thus, the last suggestion which might enhance future study is to group the states by region to identify any potential spillover effects neighboring states might have on one another when it comes to the relationship between government spending and economic growth.

Summary

This chapter provided a discussion of the results within the framework of existing academic literature. Specifically, the relationship between government spending and economic growth was examined on a state level. Additionally, individual spending categories were reviewed as they pertained to the relationship between government spending and economic output on a state level. While isolating the effects of government spending on economic output is not a precise science, the results from this study are generally consistent with past research in showing an inverse relationship between excessive government spending and economic performance. However, conclusions from this study are limited. The findings do not confirm the existence of state-specific spending optimums in a consistent manner, suggesting the model is not universally transferable to the sub-federal level. Using a modified time setting and aggregate state and local expenditure data, regression results provide confirmation of an Armey Curve and a spending optimal that is several percentage points higher than the Vedder and Gallaway (1998) conclusion. This finding strengthens the argument that the relationship between the public sector and economic growth depends on elements that change with time. Since theoretically there should exist an optimal level of spending for each state and spending category, and given the need for governments to achieve spending efficiency in order to better promote economic growth and prosperity, further study is warranted.

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Appendix

Table 1
Regression Results on Total Expenditure (1976-2005)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-5284.296908	No (0.495)	-149391.3656	No (0.382)	No	0.61164473	N/A	25.45%
AL	-180217.5507	Yes (0.02)	432564.0264	Yes (0.022)	No	0.99307816	N/A	21.96%
AR	-109004.2287	No (0.355)	377725.3283	No (0.31)	No	0.99074146	N/A	19.80%
AZ	117034.7244	No (0.338)	-472939.7446	No (0.25)	No	0.92747316	N/A	18.51%
CA	-401471.5012	Yes (0.028)	1141930.223	Yes (0.021)	No	0.96331162	N/A	21.32%
CO	-268508.7177	No (0.279)	450693.5645	No (0.504)	No	0.94399673	N/A	16.36%
CT	**631102.6558**	**Yes (0.021)**	**-2047263.296**	**Yes (0.033)**	**Yes**	**0.98668387**	**15.41%**	**15.32%**
DC	-1151475.27	Yes (0.015)	3924427.316	Yes (0.001)	No	0.96581719	N/A	10.72%
DE	-1553084.032	Yes (0.032)	5263902.192	Yes (0.031)	No	0.97888223	N/A	13.39%
FL	1851.624213	No (0.264)	-73086.39768	No (0.292)	No	0.97706991	N/A	19.63%
GA	203015.6237	No (0.133)	-934333.9352	No (0.142)	No	0.98787825	N/A	16.44%
HI	351714.41	No (0.194)	-787653.2404	No (0.457)	No	0.78992906	N/A	19.23%
IA	-927602.235	Yes (0.025)	2340611.438	Yes (0.034)	No	0.98105109	N/A	18.27%
ID	-578264.0922	Yes (0.034)	1648275.184	Yes (0.008)	No	0.9609544	N/A	19.43%
IL	-304773.1187	No (0.289)	1075074.193	No (0.331)	No	0.98858858	N/A	17.59%
IN	-501514.7452	Yes (0.016)	1375072.226	Yes (0.005)	No	0.97946146	N/A	17.79%
KS	-1042687.585	Yes (0.003)	2890717.202	Yes (0.005)	No	0.98536053	N/A	18.01%
KY	17422.43413	No (0.311)	-94902.94589	No (0.447)	No	0.98060711	N/A	19.45%
LA	**185321.9725**	**Yes (0.029)**	**-662516.9691**	**Yes (0.017)**	**Yes**	**0.89378344**	**13.99%**	**18.06%**
MA	-1024409.143	Yes (0.018)	2908035.808	Yes (0.015)	No	0.98395105	N/A	18.53%
MD	-1443575.388	Yes (0.024)	4212021.728	Yes (0.025)	No	0.97864561	N/A	16.93%
ME	-229302.9628	No (0.215)	585525.0992	No (0.517)	No	0.98291085	N/A	22.73%
MI	-846149.8474	No (0.418)	2138327.163	No (0.266)	No	0.94012173	N/A	20.42%
MN	350810.4861	No (0.519)	-1186305.039	No (0.531)	No	0.98355262	N/A	18.55%
MO	-239763.3938	No (0.38)	875060.2901	Yes (0.033)	No	0.98122589	N/A	17.29%
MS	60012.28741	No (0.557)	-151497.475	No (0.249)	No	0.98968575	N/A	25.12%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
MT	-134049.1255	No (0.467)	196875.5754	No (0.236)	No	0.95924355	N/A	21.43%
NC	-465463.2421	No (0.302)	1474598.352	No (0.501)	No	0.98257205	N/A	17.32%
ND	-162526.5492	No (0.248)	208581.7489	No (0.189)	No	0.96563032	N/A	19.23%
NE	-1440257.291	No (0.21)	3628104.088	No (0.327)	No	0.98124172	N/A	19.84%
NH	-377222.0624	Yes (0.03)	1223838.377	Yes (0.001)	No	0.99203569	N/A	16.04%
NJ	178097.2	No (0.173)	-481015.7054	No (0.442)	No	0.98647994	N/A	18.67%
NM	-480964.5838	Yes (0.027)	1080978.402	Yes (0.019)	No	0.9425626	N/A	22.38%
NV	-545345.6049	No (0.456)	1483088.437	No (0.124)	No	0.90379828	N/A	15.80%
NY	-212753.3948	No (0.3)	514551.0608	No (0.321)	No	0.97802252	N/A	23.61%
OH	-469968.8989	Yes (0.022)	1158051.596	Yes (0.037)	No	0.97837074	N/A	20.79%
OK	-276803.2199	Yes (0.018)	691759.0384	Yes (0.014)	No	0.96417355	N/A	18.10%
OR	-1974604.988	Yes (0.02)	4406095.676	Yes (0.004)	No	0.92322063	N/A	20.51%
PA	-381406.0583	Yes (0.029)	1193470.335	Yes (0.012)	No	0.99111925	N/A	20.88%
RI	-149654.3235	No (0.254)	343022.7252	No (0.184)	No	0.9811294	N/A	21.15%
SC	3876.780106	No (0.286)	-11838.22978	No (0.405)	No	0.99487543	N/A	23.56%
SD	-4556163.834	Yes (0.014)	13141094.48	Yes (0.027)	No	0.96321577	N/A	16.28%
TN	-778625.0304	No (0.31)	2192812.859	No (0.393)	No	0.9909926	N/A	18.98%
TX	-297344.7308	No (0.571)	1008628.229	No (0.38)	No	0.96681131	N/A	15.36%
US	-544041.3872	No (0.274)	1533207.001	No (0.38)	No	0.9837358	N/A	19.18%
UT	-633798.0908	Yes (0.03)	1488070.091	Yes (0.008)	No	0.95969455	N/A	19.54%
VA	815372.3579	No (0.262)	-3091874.09	No (0.484)	No	0.97894564	N/A	14.69%
VT	-1516110.509	Yes (0.017)	3766292.887	Yes (0.028)	No	0.98999979	N/A	22.46%
WA	-336110.5124	No (0.581)	640373.3149	No (0.429)	No	0.94907746	N/A	20.56%
WI	-1145435.946	Yes (0.031)	2916080.251	Yes (0.021)	No	0.9751248	N/A	19.88%
WV	12354.86361	No (0.524)	-6308.947777	No (0.5)	No	0.98615997	N/A	22.83%
WY	-7246.977475	No (0.213)	-26464.9749	No (0.246)	No	0.9169376	N/A	20.62%

Table 2

Regression Results on Current Expenditure (1976-2005)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	76549.13241	No (0.309)	-362867.8324	No (0.102)	No	0.58919843	N/A	21.80%
AL	-235091.8498	Yes (0.019)	607520.4923	Yes (0.02)	No	0.99450805	N/A	19.27%
AR	-225727.2292	Yes (0.015)	728945.5819	Yes (0.024)	No	0.99116712	N/A	17.86%
AZ	214423.6105	No (0.415)	-1019946.025	No (0.445)	No	0.94821693	N/A	15.70%
CA	-439668.48	No (0.132)	1386100.84	No (0.451)	No	0.96170934	N/A	18.97%
CO	309565.6185	No (0.117)	-1776585.484	No (0.539)	No	0.96361773	N/A	13.94%
CT	**701471.8731**	**Yes (0.014)**	**-2608638.868**	**Yes (0.036)**	**Yes**	**0.98610229**	**13.45%**	**14.02%**
DC	-4022856.341	Yes (0.021)	18022210.6	Yes (0.008)	No	0.9738623	N/A	9.17%
DE	-2032022.882	Yes (0.027)	7860698.147	Yes (0.028)	No	0.97930177	N/A	11.54%
FL	101592.8308	No (0.268)	-485342.07	No (0.427)	No	0.9803961	N/A	16.86%
GA	840685.6775	No (0.131)	-3595420.609	No (0.11)	No	0.99097574	N/A	14.40%
HI	**630327.3981**	**Yes (0.026)**	**-2205045.773**	**Yes (0.031)**	**Yes**	**0.7935928**	**14.29%**	**17.45%**
IA	-834425.3195	Yes (0.036)	2338898.574	Yes (0.028)	No	0.98796722	N/A	15.72%
ID	-636017.5963	Yes (0.024)	2059044.113	Yes (0.012)	No	0.96458045	N/A	17.05%
IL	-293888.8086	No (0.587)	1181174.385	No (0.304)	No	0.98790271	N/A	15.66%
IN	-563082.7249	Yes (0.013)	1699276.243	Yes (0.022)	No	0.98568396	N/A	15.84%
KS	-555363.7827	Yes (0.021)	1587818.633	Yes (0.027)	No	0.99203878	N/A	15.77%
KY	-138236.6873	No (0.283)	278423.1744	No (0.282)	No	0.98310805	N/A	17.59%
LA	**177281.2173**	**Yes (0.002)**	**-710869.6764**	**Yes (0.013)**	**Yes**	**0.89100016**	**12.47%**	**16.13%**
MA	-1128793.479	Yes (0.022)	3580457.646	Yes (0.033)	No	0.98380367	N/A	16.85%
MD	-695923.8823	No (0.599)	2243132.361	No (0.398)	No	0.97847492	N/A	15.17%
ME	-273031.4421	No (0.582)	720925.599	No (0.535)	No	0.98441965	N/A	21.09%
MI	-835200.5734	No (0.251)	2132476.382	No (0.422)	No	0.95445162	N/A	18.49%
MN	209509.7365	No (0.366)	-1013731.006	No (0.346)	No	0.98846843	N/A	16.32%
MO	-261366.7635	No (0.442)	1063520.764	No (0.593)	No	0.9804436	N/A	15.43%
MS	-69414.19385	No (0.204)	114786.2261	No (0.337)	No	0.99073444	N/A	22.92%
MT	-103725.1774	No (0.312)	105721.3725	No (0.504)	No	0.97712356	N/A	18.79%
NC	-600606.6971	No (0.168)	1972232.397	No (0.271)	No	0.98648436	N/A	15.25%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
ND	-170295.153	No (0.372)	241465.5363	No (0.163)	No	0.97857507	N/A	16.48%
NE	-56016.14395	No (0.584)	-132244.5463	No (0.366)	No	0.9944825	N/A	16.83%
NH	-217104.307	Yes (0.013)	690291.3891	No (0.58)	No	0.99038907	N/A	14.57%
NJ	-53299.05805	No (0.312)	206640.5364	No (0.59)	No	0.98622157	N/A	16.82%
NM	-464899.2959	Yes (0.022)	1191779.126	Yes (0.022)	No	0.94200162	N/A	20.04%
NV	-1060536.715	No (0.105)	3576308.482	No (0.561)	No	0.92074371	N/A	12.89%
NY	205791.9672	No (0.101)	-562160.076	No (0.378)	No	0.97789331	N/A	20.87%
OH	-550231.4041	Yes (0.012)	1414006.676	Yes (0.019)	No	0.98605133	N/A	18.52%
OK	-252062.0554	Yes (0.013)	693318.181	Yes (< 0.001)	No	0.97044873	N/A	16.15%
OR	-1756641.526	Yes (0.035)	4353604.508	Yes (0.012)	No	0.94949782	N/A	18.35%
PA	-400854.1455	Yes (0.02)	1381197.517	Yes (0.028)	No	0.98887753	N/A	18.81%
RI	-291791.1146	No (0.359)	725503.7289	No (0.357)	No	0.982765	N/A	19.83%
SC	-7050.472269	No (0.318)	3444.70035	No (0.353)	No	0.99493654	N/A	20.64%
SD	-1248301.502	No (0.501)	3480387.202	No (0.586)	No	0.97467979	N/A	13.67%
TN	-927911.6758	Yes (0.016)	2854098.58	Yes (0.013)	No	0.99322692	N/A	17.36%
TX	-95520.19372	No (0.162)	191902.1599	No (0.111)	No	0.96841381	N/A	12.97%
US	-549625.5053	No (0.53)	1681371.191	No (0.555)	No	0.98439265	N/A	16.94%
UT	-222102.4933	No (0.197)	442742.5241	No (0.25)	No	0.9725292	N/A	16.93%
VA	827054.488	No (0.164)	-3798963.921	No (0.529)	No	0.98107207	N/A	13.02%
VT	-1461770.489	Yes (0.022)	3977801.532	Yes (0.005)	No	0.99085993	N/A	20.79%
WA	-429209.7776	No (0.252)	856027.7579	No (0.307)	No	0.98109173	N/A	17.24%
WI	-1578958.034	Yes (0.032)	4449117.613	Yes (0.003)	No	0.98123508	N/A	17.90%
WV	-52564.22254	No (0.17)	136904.7268	No (0.517)	No	0.98617389	N/A	20.55%
WY	-23230.55656	No (0.563)	40805.64889	No (0.505)	No	0.91389802	N/A	17.12%

Table 3

Regression Results on Capital Outlays (1976-2005)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-3053806.234	Yes (0.011)	32923823.78	Yes (0.021)	No	0.64572481	N/A	3.65%
AL	431700.4894	No (0.245)	-8260767.577	No (0.527)	No	0.99207707	N/A	2.69%
AR	16238.7066	No (0.406)	1069702.345	No (0.501)	No	0.9907085	N/A	1.94%
AZ	939796.9822	No (0.31)	-12762687.99	No (0.345)	No	0.899907	N/A	2.81%
CA	-2173207.024	Yes (< 0.001)	62403623.56	Yes (0.025)	No	0.96842424	N/A	2.35%
CO	-764149.5693	No (0.416)	13797564.55	No (0.451)	No	0.90353295	N/A	2.42%
CT	-656398.6154	No (0.198)	28051162.97	No (0.427)	No	0.98955314	N/A	1.31%
DC	584407.7531	Yes (0.03)	-6587016.368	No (0.597)	No	0.97019164	N/A	1.56%
DE	-2219905.616	No (0.131)	62852537.85	No (0.507)	No	0.97528036	N/A	1.85%
FL	-14870.28032	No (0.289)	2542424.115	No (0.512)	No	0.98103744	N/A	2.77%
GA	916643.3642	No (0.206)	-18961479.79	No (0.127)	No	0.97967239	N/A	2.04%
HI	-7339.8818	No (0.425)	2771544.237	No (0.272)	No	0.93446708	N/A	1.79%
IA	1894109.255	No (0.4)	-32932448.06	No (0.137)	No	0.9546804	N/A	2.54%
ID	-3078514.095	No (0.378)	58337086.9	No (0.527)	No	0.9519435	N/A	2.37%
IL	-641791.7358	No (0.452)	18706792.7	No (0.335)	No	0.9880386	N/A	1.93%
IN	-3247423.612	No (0.437)	95833591.25	No (0.146)	No	0.95670321	N/A	1.95%
KS	-6054.572727	No (0.108)	2084088.291	No (0.23)	No	0.96956591	N/A	2.23%
KY	64653.96411	No (0.506)	-694611.204	No (0.264)	No	0.98011573	N/A	1.86%
LA	-510188.1198	No (0.558)	11012446.94	No (0.119)	No	0.82195349	N/A	1.94%
MA	-3281275.851	No (0.314)	83156024.61	No (0.578)	No	0.97974766	N/A	1.68%
MD	238892.2965	No (0.489)	-3158467.769	No (0.483)	No	0.9734906	N/A	1.75%
ME	39810.76697	No (0.285)	1732065.452	No (0.48)	No	0.98580715	N/A	1.64%
MI	-1203550.126	No (0.541)	39636297.26	No (0.361)	No	0.94819228	N/A	1.92%
MN	-2799260.131	No (0.143)	52690406.44	No (0.494)	No	0.96838342	N/A	2.23%
MO	-1397970.139	No (0.284)	40076550.91	No (0.201)	No	0.98101671	N/A	1.86%
MS	-362089.8642	No (0.19)	7802745.839	Yes (0.026)	No	0.99058622	N/A	2.20%
MT	604109.3234	No (0.203)	-10418851.31	No (0.308)	No	0.87065029	N/A	2.64%
NC	-520025.3535	No (0.478)	15333160.14	No (0.134)	No	0.98516121	N/A	2.07%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
ND	-230751.596	No (0.432)	4791943.413	No (0.3)	No	0.84774952	N/A	2.75%
NE	163819.6075	No (0.494)	-1136140.499	No (0.211)	No	0.99054735	N/A	3.01%
NH	-17877.44362	No (0.456)	1993336.843	No (0.446)	No	0.98986652	N/A	1.47%
NJ	1603174.237	No (0.19)	-47074398.84	No (0.239)	No	0.98743252	N/A	1.85%
NM	1361649.157	No (0.576)	-29365209.79	No (0.184)	No	0.91791201	N/A	2.34%
NV	-1155715.484	No (0.338)	21392712.41	No (0.126)	No	0.89298281	N/A	2.91%
NY	-498078.6959	No (0.185)	14716723.03	No (0.369)	No	0.98630396	N/A	2.73%
OH	-1754416.537	No (0.316)	50715122.6	Yes (0.013)	No	0.9780148	N/A	2.27%
OK	753583.6956	No (0.433)	-15378514.59	No (0.397)	No	0.89469618	N/A	1.95%
OR	729371.2997	No (0.148)	-7139957.835	No (0.494)	No	0.87729428	N/A	2.15%
PA	-262892.0427	No (0.131)	10968328.06	No (0.379)	No	0.98889193	N/A	2.07%
RI	452965.3341	No (0.578)	-12294724.17	No (0.371)	No	0.98134517	N/A	1.32%
SC	59215.53971	No (0.379)	-944572.0656	No (0.492)	No	0.99500771	N/A	2.93%
SD	982198.2215	No (0.17)	-13014659.9	No (0.155)	No	0.96097318	N/A	2.61%
TN	-705675.8177	Yes (0.008)	14515844.46	Yes (0.034)	No	0.99220861	N/A	1.62%
TX	1247346.114	No (0.537)	-24327207.16	No (0.312)	No	0.97073046	N/A	2.38%
US	-2056110.277	No (0.365)	51194632.2	No (0.499)	No	0.98786831	N/A	2.24%
UT	282419.0684	No (0.125)	-2783633.631	No (0.422)	No	0.92635088	N/A	2.62%
VA	-926128.3405	No (0.483)	24757797.61	No (0.158)	No	0.97857958	N/A	1.67%
VT	402483.8828	No (0.575)	-7577001.611	No (0.561)	No	0.97650574	N/A	1.67%
WA	-30393.92773	No (0.173)	1124343.972	No (0.22)	No	0.93694138	N/A	3.33%
WI	-1427699.524	No (0.147)	36549282.01	No (0.434)	No	0.96441492	N/A	1.99%
WV	74507.05906	No (0.225)	-387210.3789	No (0.143)	No	0.98907806	N/A	2.28%
WY	-523938.4754	No (0.18)	6238229.278	No (0.483)	No	0.92540978	N/A	3.51%

Table 4
Regression Results on Total Education Expenditure (1976-2005)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-1245506.021	Yes (0.028)	5007017.085	No (0.204)	No	0.85	N/A	5.99%
AL	-265078.486	No (0.317)	2400211.79	No (0.462)	No	0.99	N/A	6.53%
AR	-578257.2146	Yes (0.016)	5352991.14	Yes (0.026)	No	0.99	N/A	6.76%
AZ	-2441742.813	Yes (0.014)	19190339.01	Yes (0.034)	No	0.94	N/A	5.12%
CA	-1532586.077	Yes (0.032)	16598241.65	Yes (0.013)	No	0.97	N/A	5.48%
CO	-5273039.614	Yes (0.017)	46490870.55	Yes (0.019)	No	0.96	N/A	4.72%
CT	211890.8045	No (0.232)	-2589865.204	No (0.561)	No	0.98	N/A	4.72%
DC	4653937.258	Yes (0.02)	-95129228.31	No (0.543)	No	0.98	N/A	1.70%
DE	-3921323.368	Yes (0.012)	38325662.07	Yes (0.007)	No	0.98	N/A	4.29%
FL	-856685.7252	No (0.478)	8599181.241	No (0.178)	No	0.98	N/A	4.81%
GA	295612.3738	No (0.126)	-3802518.663	No (0.147)	No	0.98	N/A	5.56%
HI	-474090.179	No (0.207)	3979754.708	No (0.248)	No	0.75	N/A	4.84%
IA	-3359658.932	Yes (0.013)	25202600.76	Yes (0.023)	No	0.97	N/A	6.17%
ID	-1917675.891	Yes (0.02)	15837757.55	Yes (0.032)	No	0.96	N/A	6.05%
IL	-901176.2541	No (0.245)	11054088.85	No (0.26)	No	0.99	N/A	5.14%
IN	-1581544.485	No (0.258)	12105935.74	No (0.519)	No	0.97	N/A	6.18%
KS	-763276.2259	No (0.398)	5100748.331	No (0.209)	No	0.98	N/A	5.98%
KY	245218.1262	No (0.437)	-3084889.971	No (0.326)	No	0.98	N/A	5.95%
LA	**526946.5878**	**Yes (0.012)**	**-7027951.148**	**Yes (0.027)**	**Yes**	**0.89**	**3.75%**	**4.98%**
MA	-1491426.393	Yes (0.022)	17086222.88	Yes (0.009)	No	0.98	N/A	5.01%
MD	-1698254.336	Yes (0.024)	15101200.17	Yes (0.009)	No	0.98	N/A	5.54%
ME	-849042.6287	No (0.541)	7864688.217	No (0.502)	No	0.98	N/A	6.38%
MI	-1984312.085	Yes (0.012)	15800346	Yes (0.024)	No	0.94	N/A	7.30%
MN	-3942617.905	Yes (0.011)	32442083.08	Yes (0.021)	No	0.98	N/A	5.27%
MO	-1157500.324	Yes (0.012)	12939890.44	Yes (0.011)	No	0.98	N/A	5.24%
MS	58195.92855	No (0.408)	-816599.1556	No (0.161)	No	0.99	N/A	7.35%
MT	-115586.6754	No (0.446)	-110726.7924	No (0.559)	No	0.95	N/A	6.65%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-5112910.602	No (0.252)	50034663.18	No (0.337)	No	0.98	N/A	5.33%
ND	137618.3285	No (0.407)	-3047360.468	No (0.478)	No	0.98	N/A	6.42%
NE	-2028192.552	No (0.447)	15871355.39	No (0.591)	No	0.99	N/A	5.72%
NH	-1182252.314	Yes (0.01)	12683967.86	Yes (0.023)	No	0.99	N/A	5.35%
NJ	181503.0989	No (0.371)	-2376170.322	No (0.439)	No	0.99	N/A	6.22%
NM	-1290329.188	No (0.505)	9200108.63	No (0.222)	No	0.90	N/A	7.00%
NV	**2489304.388**	**Yes (0.024)**	**-34069083.6**	**Yes (0.017)**	**Yes**	**0.93**	**3.65%**	**4.07%**
NY	-2689083.767	Yes (0.032)	26999042.94	Yes (0.02)	No	0.98	N/A	5.60%
OH	-1464623.775	No (0.38)	13803797.26	No (0.334)	No	0.97	N/A	6.22%
OK	-1037516.332	Yes (0.026)	8180572.514	Yes (0.019)	No	0.95	N/A	6.22%
OR	512285.6342	No (0.341)	-8765810.491	No (0.196)	No	0.91	N/A	5.56%
PA	-1193750.195	Yes (0.026)	12407941.79	Yes (0.007)	No	0.99	N/A	6.21%
RI	-2719330.43	No (0.521)	24859720.05	No (0.573)	No	0.98	N/A	5.77%
SC	66346.89495	No (0.178)	-374891.3279	No (0.163)	No	1.00	N/A	6.97%
SD	-2784643.63	No (0.356)	24699816.62	Yes (0.025)	No	0.96	N/A	4.98%
TN	-437316.2775	No (0.54)	5310916.643	No (0.209)	No	0.99	N/A	4.60%
TX	-1312702.385	Yes (0.037)	14916335.92	Yes (0.024)	No	0.97	N/A	5.34%
US	-4195579.3	Yes (0.025)	41915451.01	Yes (0.02)	No	0.99	N/A	5.57%
UT	-7714787.424	Yes (0.015)	56393961.2	Yes (0.021)	No	0.94	N/A	6.25%
VA	-5609029.564	No (0.125)	57301216.73	No (0.47)	No	0.98	N/A	5.01%
VT	-1282881.237	No (0.259)	9711443.909	No (0.554)	No	0.98	N/A	8.26%
WA	4825067.274	No (0.524)	-44480419.19	No (0.248)	No	0.94	N/A	5.35%
WI	-5303090.729	No (0.439)	40877312.09	No (0.221)	No	0.96	N/A	6.36%
WV	-395942.8303	No (0.509)	3055968.617	No (0.42)	No	0.99	N/A	7.38%
WY	-99341.86617	No (0.294)	486386.5748	No (0.422)	No	0.92	N/A	5.77%

Table 5
Regression Results on Secondary Education Expenditure (1976-2005)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-1363874.754	No (0.202)	6768656.71	No (0.142)	No	0.82	N/A	4.39%
AL	94824.94733	No (0.379)	-1350494.296	No (0.246)	No	0.99	N/A	3.84%
AR	-1136425.11	No (0.248)	15968377.98	Yes (0.036)	No	0.99	N/A	4.42%
AZ	-4471260.696	Yes (0.017)	54843117.87	Yes (0.015)	No	0.95	N/A	3.27%
CA	-2088589.975	Yes (0.02)	33238902.66	Yes (0.013)	No	0.98	N/A	3.82%
CO	-8556179.87	Yes (0.01)	112884971.3	Yes (0.019)	No	0.96	N/A	3.23%
CT	-173901.7848	No (0.332)	3662975.639	No (0.483)	No	0.98	N/A	3.50%
DC	6916215.99	Yes (0.024)	-184188279.6	No (0.197)	No	0.98	N/A	1.58%
DE	-5099137.789	Yes (0.035)	86308436.45	Yes (0.017)	No	0.98	N/A	2.56%
FL	-74543.26119	No (0.446)	172453.337	No (0.514)	No	0.98	N/A	3.50%
GA	696375.0182	No (0.51)	-12258490.49	No (0.39)	No	0.98	N/A	3.96%
HI	238537.9846	No (0.471)	-7384015.123	No (0.337)	No	0.75	N/A	3.16%
IA	-3107104.25	No (0.319)	37612024.32	No (0.549)	No	0.95	N/A	3.72%
ID	-2340751.541	No (0.554)	29089531.98	No (0.163)	No	0.95	N/A	3.88%
IL	-2378531.407	Yes (0.016)	39921874.44	Yes (0.021)	No	0.99	N/A	3.57%
IN	-2923444.668	No (0.302)	34987143.14	No (0.153)	No	0.97	N/A	4.08%
KS	477528.7221	No (0.256)	-10660347.17	No (0.39)	No	0.99	N/A	3.61%
KY	175345.0237	No (0.403)	-2961363.143	No (0.137)	No	0.98	N/A	3.57%
LA	**1085113.043**	**Yes (0.011)**	**-20255001.44**	**Yes (0.006)**	**Yes**	**0.90**	**2.68%**	**3.26%**
MA	-1313479.965	Yes (0.017)	19223563.99	Yes (0.005)	No	0.98	N/A	3.44%
MD	-1332587.505	No (0.428)	16703768.71	No (0.389)	No	0.98	N/A	3.67%
ME	-605467.3755	No (0.308)	7704897.427	No (0.199)	No	0.98	N/A	4.57%
MI	-2631973.028	No (0.118)	30874071.73	No (0.143)	No	0.94	N/A	4.98%
MN	-2371745.268	No (0.325)	25766270.52	No (0.175)	No	0.98	N/A	3.62%
MO	-2135430.686	Yes (0.032)	31623259.62	Yes (0.004)	No	0.98	N/A	3.65%
MS	262658.0747	No (0.438)	-4129654.621	No (0.55)	No	0.99	N/A	4.44%
MT	-356451.7725	No (0.148)	1587164.332	No (0.588)	No	0.97	N/A	4.18%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-697826.198	No (0.214)	10822617.63	No (0.495)	No	0.98	N/A	3.06%
ND	121521.6836	No (0.473)	-7078180.525	No (0.214)	No	0.96	N/A	3.67%
NE	-2966953.029	No (0.196)	36274618.48	No (0.536)	No	0.99	N/A	3.60%
NH	-1656125.583	Yes (0.023)	24924107.51	Yes (0.011)	No	0.99	N/A	3.94%
NJ	156487.2624	No (0.438)	-3009022.714	No (0.235)	No	0.99	N/A	4.90%
NM	-925773.4824	No (0.308)	10796735.38	No (0.571)	No	0.89	N/A	4.26%
NV	1083867.361	No (0.55)	-22417959.28	No (0.272)	No	0.91	N/A	2.99%
NY	-2435772.818	Yes (0.029)	32449194.87	Yes (0.025)	No	0.98	N/A	4.41%
OH	-2513555.438	No (0.469)	33377548.7	No (0.457)	No	0.97	N/A	4.32%
OK	-878504.2109	Yes (0.019)	8925286.58	Yes (0.019)	No	0.97	N/A	3.87%
OR	57184.74991	No (0.498)	-9367134.85	No (0.299)	No	0.95	N/A	3.45%
PA	-766891.3724	No (0.526)	10932888.71	No (0.118)	No	0.98	N/A	4.27%
RI	-2374074.951	No (0.453)	31734618.66	No (0.315)	No	0.98	N/A	4.22%
SC	88336.10464	No (0.255)	-411123.5723	No (0.371)	No	1.00	N/A	4.56%
SD	-6834689.677	Yes (0.027)	85261782.27	Yes (0.014)	No	0.98	N/A	3.34%
TN	-958821.2206	No (0.418)	18364919.33	No (0.159)	No	0.99	N/A	3.11%
TX	-1382946.869	Yes (0.026)	21790230.28	Yes (0.029)	No	0.97	N/A	3.66%
US	-6280910.486	Yes (0.025)	90444256.41	Yes (0.027)	No	0.99	N/A	3.83%
UT	-6031018.739	Yes (0.013)	70360723.99	Yes (0.015)	No	0.96	N/A	3.52%
VA	-6337359.22	No (0.12)	95336441.19	No (0.223)	No	0.98	N/A	3.44%
VT	-874080.0376	No (0.362)	11189234.03	No (0.364)	No	0.98	N/A	5.22%
WA	2762890.749	No (0.394)	-39718288.22	No (0.294)	No	0.95	N/A	3.33%
WI	-2716564.384	No (0.571)	30156314.92	No (0.438)	No	0.96	N/A	4.13%
WV	-1107796.315	No (0.147)	12113092.56	No (0.503)	No	0.99	N/A	4.60%
WY	-172654.5075	No (0.249)	1183376.27	No (0.535)	No	0.92	N/A	3.76%

Table 6
Regression Results on Higher Education Expenditure (1976-2005)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-12118278.95	Yes (0.014)	367986647.9	Yes (0.018)	No	0.78	N/A	1.39%
AL	-2217474.958	Yes (0.049)	56937651.77	Yes (0.019)	No	1.00	N/A	2.31%
AR	-587452.982	No (0.599)	20260048.23	No (0.451)	No	0.99	N/A	1.96%
AZ	-1160067.019	No (0.258)	25189283.65	No (0.187)	No	0.90	N/A	1.62%
CA	**5138864.078**	**Yes (0.016)**	**-162784294.6**	**Yes (0.026)**	**Yes**	**0.98**	**1.58%**	**1.44%**
CO	-8015194.72	Yes (0.018)	234117377	Yes (0.025)	No	0.92	N/A	1.36%
CT	-2285930.27	No (0.439)	108014763.8	No (0.429)	No	0.99	N/A	1.01%
DC	-609131.3101	No (0.512)	1270383075	No (0.498)	No	0.98	N/A	0.12%
DE	-3910155.013	No (0.45)	86957857.28	No (0.541)	No	0.98	N/A	1.44%
FL	-2254644.667	No (0.221)	112430277	No (0.116)	No	0.98	N/A	1.07%
GA	5590184.657	No (0.376)	-247285020.7	No (0.283)	No	0.98	N/A	1.24%
HI	-1957916.95	No (0.58)	54343551.53	No (0.204)	No	0.74	N/A	1.61%
IA	-4899957.959	Yes (0.026)	104767377	Yes (0.026)	No	0.99	N/A	2.15%
ID	-2969373.97	No (0.566)	78564935.05	No (0.25)	No	0.95	N/A	1.88%
IL	-2621890.917	No (0.399)	121245272.5	No (0.451)	No	0.99	N/A	1.33%
IN	-5927564.393	Yes (0.023)	164736434.3	Yes (0.024)	No	0.97	N/A	1.79%
KS	-3403495.184	Yes (0.036)	88353042.9	Yes (0.023)	No	0.97	N/A	2.17%
KY	-262861.6093	No (0.397)	3764592.534	No (0.256)	No	0.98	N/A	1.85%
LA	**2322818.594**	**Yes (0.029)**	**-112550010.7**	**Yes (0.047)**	**Yes**	**0.89**	**1.03%**	**1.32%**
MA	3078259.438	No (0.58)	-105369676.9	No (0.355)	No	0.99	N/A	0.97%
MD	-7762240.148	Yes (0.028)	264331185.7	Yes (0.029)	No	0.98	N/A	1.58%
ME	-842919.9672	No (0.327)	45067786.89	No (0.106)	No	0.98	N/A	1.49%
MI	-5648403.969	Yes (0.009)	149483335.5	Yes (0.012)	No	0.95	N/A	2.12%
MN	-7764127.607	Yes (0.013)	248521209.3	Yes (0.004)	No	0.97	N/A	1.35%
MO	-946017.587	No (0.17)	63205336.52	No (0.452)	No	0.99	N/A	1.35%
MS	283440.2931	No (0.196)	-8374759.872	No (0.178)	No	0.99	N/A	2.54%
MT	-1102663.876	Yes (0.021)	30337235.53	Yes (0.017)	No	0.89	N/A	2.05%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-1862327.234	No (0.256)	52566459.51	No (0.295)	No	0.98	N/A	2.11%
ND	-652364.852	No (0.295)	1914623.648	No (0.254)	No	0.97	N/A	2.54%
NE	-5816368.246	Yes (0.014)	156234578.3	Yes (0.038)	No	0.99	N/A	1.91%
NH	-2312026.843	Yes (0.016)	99428530.52	Yes (0.014)	No	0.99	N/A	1.24%
NJ	**8626418.964**	**Yes (0.003)**	**-449212333.1**	**Yes (0.003)**	**Yes**	**0.99**	**0.96%**	**1.12%**
NM	-2596588.229	Yes (0.012)	50260716.07	Yes (0.038)	No	0.92	N/A	2.45%
NV	**17466600.09**	**Yes (0.018)**	**-951825117.1**	**Yes (0.01)**	**Yes**	**0.95**	**0.92%**	**0.96%**
NY	1829740.423	No (0.103)	-80546842.43	No (0.54)	No	0.98	N/A	0.98%
OH	-7556731.277	Yes (0.011)	271197346.9	Yes (0.003)	No	0.97	N/A	1.53%
OK	-2653903.554	Yes (0.031)	77112130.09	Yes (0.017)	No	0.94	N/A	2.06%
OR	-8694629.692	No (0.595)	247763513.9	No (0.464)	No	0.86	N/A	1.92%
PA	-1496916.921	Yes (0.029)	76301421.38	Yes (0.035)	No	0.99	N/A	1.35%
RI	-4721641.865	No (0.153)	183070952.1	No (0.288)	No	0.98	N/A	1.18%
SC	1263755.974	No (0.287)	-43368942.85	No (0.285)	No	1.00	N/A	1.86%
SD	1467792.371	No (0.108)	-22386914.61	No (0.372)	No	0.98	N/A	1.39%
TN	-249701.3391	No (0.511)	-4355090.665	No (0.136)	No	0.99	N/A	1.22%
TX	-4917005.639	Yes (0.011)	200755290.2	Yes (0.015)	No	0.98	N/A	1.51%
US	-9031493.161	Yes (0.025)	357141201.1	Yes (0.031)	No	0.99	N/A	1.47%
UT	-2607459.706	No (0.249)	55761674.87	No (0.342)	No	0.93	N/A	2.47%
VA	-7940357.165	No (0.409)	303107626.4	No (0.274)	No	0.98	N/A	1.39%
VT	-4281898.427	No (0.199)	102588282	No (0.338)	No	0.98	N/A	2.54%
WA	-11487014.86	Yes (0.01)	357749390.5	Yes (0.021)	No	0.94	N/A	1.67%
WI	-10629226.13	No (0.442)	284653006.6	No (0.232)	No	0.96	N/A	2.02%
WV	-314577.8117	No (0.384)	7197598.307	No (0.564)	No	0.99	N/A	2.07%
WY	-596341.7666	No (0.199)	17704967.94	No (0.157)	No	0.91	N/A	1.74%

Table 7
Regression Results on Public Welfare Expenditure (1976-2005)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-3202828.208	Yes (0.019)	33151272.56	Yes (0.029)	No	0.84	N/A	3.50%
AL	-228578.5065	Yes (0.016)	5158311.908	Yes (0.022)	No	0.99	N/A	3.33%
AR	-251420.7588	Yes (0.04)	5283533.373	Yes (0.016)	No	0.99	N/A	3.80%
AZ	-953636.0584	Yes (0.016)	18564243.37	Yes (0.009)	No	0.97	N/A	2.78%
CA	-964509.2538	No (0.135)	21606648.66	No (0.276)	No	0.95	N/A	2.74%
CO	-189827.5829	No (0.444)	-12615863.02	No (0.152)	No	0.94	N/A	1.51%
CT	271518.2119	No (0.514)	-10246334.24	No (0.189)	No	0.99	N/A	2.25%
DC	**9635566.554**	**Yes (0.025)**	**-252880235.4**	**Yes (0.012)**	**Yes**	**0.97**	**1.91%**	**2.13%**
DE	-143811.1755	No (0.323)	12412826.13	No (0.131)	No	0.97	N/A	1.98%
FL	-709015.9372	Yes (0.024)	15815208.46	Yes (0.008)	No	0.99	N/A	2.65%
GA	114727.7218	No (0.491)	-8317948.648	No (0.113)	No	0.98	N/A	2.46%
HI	**1721315.616**	**Yes (0.034)**	**-51470501.38**	**Yes (0.021)**	**Yes**	**0.81**	**1.67%**	**2.63%**
IA	-2487518.473	Yes (0.024)	48295504.08	Yes (0.021)	No	0.98	N/A	2.75%
ID	-82593.72728	No (0.186)	8880347.699	No (0.48)	No	0.97	N/A	3.06%
IL	**2323584.157**	**Yes (0.028)**	**-61261562.6**	**Yes (0.006)**	**Yes**	**0.99**	**1.90%**	**2.37%**
IN	-1758993.407	Yes (0.018)	36434748.61	Yes (0.005)	No	0.99	N/A	2.54%
KS	-887496.2047	Yes (0.016)	25626633.85	Yes (0.018)	No	0.98	N/A	2.63%
KY	2681.124201	No (0.24)	-633880.0079	No (0.577)	No	0.98	N/A	3.91%
LA	-212328.9828	No (0.169)	3697462.188	No (0.356)	No	0.83	N/A	2.49%
MA	-1620930.345	Yes (0.013)	27889234.5	No (0.138)	No	0.98	N/A	3.37%
MD	-3388604.781	Yes (0.011)	80593315.79	Yes (0.015)	No	0.99	N/A	2.44%
ME	-385493.8715	Yes (0.01)	3245556.214	Yes (0.023)	No	0.99	N/A	5.20%
MI	-2995581.802	No (0.542)	55762717.55	No (0.565)	No	0.94	N/A	2.70%
MN	-2009255.778	Yes (0.006)	29618631.58	Yes (0.007)	No	0.98	N/A	3.93%
MO	-487938.0053	Yes (0.022)	11204806.2	Yes (0.022)	No	0.98	N/A	2.95%
MS	-32940.74684	No (0.509)	44951.84599	No (0.401)	No	0.99	N/A	5.10%
MT	-1141343.473	Yes (0.013)	19910337	Yes (0.008)	No	0.97	N/A	2.69%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-610731.2826	Yes (0.011)	18319808.05	Yes (0.015)	No	0.99	N/A	2.75%
ND	-1067905.375	Yes (0.031)	15496724.87	Yes (0.013)	No	0.97	N/A	2.86%
NE	-971512.0316	Yes (< 0.001)	21107769.43	Yes (0.03)	No	0.99	N/A	2.80%
NH	-221995.646	Yes (0.013)	3099303.094	Yes (0.028)	No	0.99	N/A	3.00%
NJ	327756.4302	No (0.324)	-7811726.353	No (0.378)	No	0.99	N/A	2.62%
NM	443568.8328	No (0.214)	-2181377.923	No (0.154)	No	0.93	N/A	4.53%
NV	-1608554.311	No (0.292)	77146840.76	No (0.522)	No	0.90	N/A	1.49%
NY	-250609.1478	No (0.134)	1984751.782	No (0.278)	No	0.98	N/A	4.44%
OH	-900993.2716	Yes (0.043)	11781246.86	Yes (0.027)	No	0.99	N/A	3.46%
OK	-589026.9105	Yes (0.015)	14042737.63	Yes (0.035)	No	0.95	N/A	3.10%
OR	241979.0497	No (0.425)	2388215.423	No (0.158)	No	0.89	N/A	2.68%
PA	7059.115407	No (0.254)	1374276.693	No (0.306)	No	0.99	N/A	4.20%
RI	-1012712.722	Yes (0.034)	14214167.9	Yes (0.021)	No	0.99	N/A	4.77%
SC	-36159.58347	No (0.429)	688536.2623	No (0.515)	No	0.99	N/A	3.71%
SD	-3870316.869	Yes (0.012)	112330040.2	Yes (0.013)	No	0.98	N/A	2.44%
TN	-29591.74702	No (0.32)	2016204.968	No (0.589)	No	0.99	N/A	3.84%
TX	-533125.2888	No (0.422)	15920773.83	No (0.12)	No	0.96	N/A	1.96%
US	-1188284.587	Yes (0.01)	25111576.32	Yes (0.017)	No	0.99	N/A	2.93%
UT	-1591920.602	Yes (0.018)	43390323.26	Yes (0.014)	No	0.94	N/A	2.52%
VA	-1905184.169	Yes (0.007)	67016468.36	Yes (0.014)	No	0.98	N/A	1.92%
VT	-574567.7856	Yes (0.006)	8256083.177	Yes (0.016)	No	0.99	N/A	4.90%
WA	-1375750.126	Yes (0.005)	30184617.02	No (0.217)	No	0.94	N/A	2.49%
WI	-2242378.183	Yes (0.032)	38105005.33	Yes (0.014)	No	0.98	N/A	3.23%
WV	-26022.32487	No (0.454)	1178861.674	No (0.237)	No	0.99	N/A	4.41%
WY	-204461.9319	No (0.132)	5609457.667	No (0.454)	No	0.91	N/A	2.03%

Table 8
Regression Results on Financial Administration Expenditure (1976-2005)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	1165426.325	No (0.335)	-73601040.28	No (0.474)	No	0.57	N/A	0.57%
AL	-77007.24943	No (0.114)	-16335231.51	No (0.382)	No	0.99	N/A	0.28%
AR	-1853692.932	Yes (0.023)	141360245.3	Yes (0.035)	No	0.99	N/A	0.50%
AZ	1581918.551	No (0.167)	-155452506.1	Yes (0.02)	Yes	0.95	0.51%	0.31%
CA	-3575960.489	Yes (0.019)	231810178.5	Yes (0.017)	No	0.97	N/A	0.37%
CO	**3405637.643**	**Yes (0.006)**	**-371589898.5**	**Yes (0.013)**	**Yes**	**0.95**	**0.46%**	**0.29%**
CT	1102053.753	No (0.184)	-97056034.5	No (0.347)	No	0.98	N/A	0.28%
DC	-22944.83942	No (0.558)	-377026145.6	No (0.297)	No	0.98	N/A	0.23%
DE	1038064.307	No (0.504)	-171208167.8	No (0.133)	No	0.98	N/A	0.39%
FL	**1688436.049**	**No (0.51)**	**-153758601.2**	**Yes (0.018)**	**Yes**	**0.99**	**0.55%**	**0.40%**
GA	860968.2854	No (0.146)	-86544665.87	No (0.528)	No	0.98	N/A	0.20%
HI	-3642699.343	Yes (0.009)	302104897.4	Yes (< 0.001)	No	0.80	N/A	0.24%
IA	842240.8549	No (0.28)	-147897385.4	No (0.283)	No	0.96	N/A	0.27%
ID	-4678394.711	Yes (0.024)	299507765.7	Yes (0.027)	No	0.97	N/A	0.46%
IL	-3895515.92	Yes (0.027)	396842801.2	Yes (0.02)	No	0.99	N/A	0.28%
IN	-5475289.188	Yes (0.021)	500756554.2	Yes (< 0.001)	No	0.97	N/A	0.29%
KS	-1263346.357	Yes (0.01)	89686207.96	No (0.284)	No	0.97	N/A	0.26%
KY	-23616.43425	No (0.278)	-3239412.404	No (0.135)	No	0.98	N/A	0.28%
LA	1039967.425	No (0.554)	-120221570.7	No (0.414)	No	0.88	N/A	0.31%
MA	439927.5798	No (0.438)	-61384159.64	No (0.202)	No	0.98	N/A	0.24%
MD	914684.9999	No (0.164)	-132485373.6	No (0.374)	No	0.98	N/A	0.28%
ME	-2019936.628	No (0.407)	148518553.9	No (0.208)	No	0.98	N/A	0.42%
MI	6622883.426	Yes (0.013)	-674345409.5	Yes (0.033)	Yes	0.96	0.49%	0.25%
MN	**4913083.657**	**Yes (0.011)**	**-501295887.9**	**Yes (0.019)**	**Yes**	**0.99**	**0.49%**	**0.25%**
MO	-5842285.322	Yes (0.017)	701074151.6	Yes (0.022)	No	0.98	N/A	0.24%
MS	20208.1454	No (0.267)	2567244.633	No (0.38)	No	0.99	N/A	0.32%
MT	-3066438.949	Yes (0.024)	143584626.4	Yes (0.033)	No	0.93	N/A	0.60%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	**3784947.487**	**Yes (0.004)**	**-586667034.9**	**Yes (0.031)**	**Yes**	**0.99**	**0.32%**	**0.15%**
ND	-7191117.658	Yes (0.025)	509824887.1	Yes (0.022)	No	0.92	N/A	0.38%
NE	194480.1384	No (0.264)	-49949354.3	No (0.143)	No	0.98	N/A	0.26%
NH	338924.4875	No (0.461)	-33991859.79	No (0.331)	No	0.99	N/A	0.23%
NJ	905274.736	No (0.215)	-66444686.52	No (0.479)	No	0.99	N/A	0.24%
NM	146629.7737	No (0.578)	-36749605.1	No (0.301)	No	0.90	N/A	0.42%
NV	-1343312.958	No (0.543)	90802579.05	No (0.174)	No	0.90	N/A	0.26%
NY	-392674.3323	No (0.116)	2471331.718	No (0.534)	No	0.98	N/A	0.29%
OH	-2184317.306	Yes (0.02)	143050800.9	Yes (0.031)	No	0.98	N/A	0.46%
OK	-2749294.659	Yes (0.007)	214920837.9	Yes (0.02)	No	0.94	N/A	0.28%
OR	-886978.8648	No (0.342)	18209591.08	No (0.17)	No	0.86	N/A	0.47%
PA	-4738579.367	Yes (< 0.001)	465309047	Yes (0.01)	No	0.99	N/A	0.26%
RI	-5167002.065	Yes (0.024)	370691603.7	Yes (0.004)	No	0.98	N/A	0.41%
SC	-317313.7905	No (0.552)	24570956.38	No (0.202)	No	1.00	N/A	0.54%
SD	-2240263.172	No (0.575)	135557633	No (0.472)	No	0.96	N/A	0.34%
TN	-1492823.878	No (0.183)	161601542.6	No (0.221)	No	0.99	N/A	0.22%
TX	**3283844.414**	**Yes (0.044)**	**-499221125**	**Yes (0.02)**	**Yes**	**0.98**	**0.33%**	**0.17%**
US	-2323834.615	No (0.143)	189489497.4	No (0.228)	No	0.98	N/A	0.30%
UT	-7740440.256	Yes (0.005)	556311440.1	Yes (0.006)	No	0.96	N/A	0.42%
VA	51234.93165	No (0.561)	-61339596.06	No (0.18)	No	0.98	N/A	0.26%
VT	445356.2032	No (0.123)	-57053699.56	No (0.505)	No	0.98	N/A	0.33%
WA	**3781878.211**	**Yes (< 0.001)**	**-410675950.9**	**Yes (0.027)**	**Yes**	**0.98**	**0.46%**	**0.24%**
WI	1905959.554	No (0.536)	-225070631.7	No (0.29)	No	0.96	N/A	0.22%
WV	-82746.05918	No (0.447)	5806349.857	No (0.177)	No	0.99	N/A	0.62%
WY	599147.0987	No (0.335)	-48906221.03	No (0.46)	No	0.92	N/A	0.32%

Table 9
Regression Results on Health and Hospital Expenditure (1976-2005)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-4952768.633	No (0.345)	233038488.3	No (0.257)	No	0.58	N/A	0.76%
AL	-486125.6865	Yes (0.01)	6989198.638	Yes (0.009)	No	1.00	N/A	3.37%
AR	-2154012.21	Yes (0.021)	74634597.19	Yes (0.031)	No	0.99	N/A	1.32%
AZ	-6372979.21	Yes (0.002)	382684201.3	Yes (0.021)	No	0.93	N/A	1.06%
CA	-2421678.089	No (0.446)	53562097.38	No (0.365)	No	0.97	N/A	1.58%
CO	-8105308.587	Yes (0.009)	440934435.3	Yes (0.033)	No	0.93	N/A	1.11%
CT	**12388082.33**	**Yes (0.022)**	**-637530484.2**	**Yes (0.025)**	**Yes**	**0.99**	**0.97%**	**0.91%**
DC	-11629606.1	No (0.365)	572750856	No (0.536)	No	0.96	N/A	0.77%
DE	9793828.099	No (0.105)	-785141042.3	No (0.431)	No	0.97	N/A	0.65%
FL	2291274.889	No (0.467)	-93565239.97	No (0.111)	No	0.99	N/A	1.40%
GA	-937149.8318	No (0.333)	19988914.73	No (0.391)	No	0.98	N/A	1.39%
HI	**7190768.913**	**Yes (0.026)**	**-286619373.4**	**Yes (0.004)**	**Yes**	**0.83**	**1.25%**	**1.52%**
IA	-2581803.716	Yes (0.01)	61674429.16	No (0.201)	No	0.98	N/A	1.89%
ID	-6949615.834	Yes (0.015)	220771994.5	Yes (0.011)	No	0.97	N/A	1.71%
IL	-5306744.403	Yes (0.033)	325206521.6	Yes (0.012)	No	0.99	N/A	0.96%
IN	-5888132.239	Yes (0.016)	182737074.1	Yes (0.021)	No	0.99	N/A	1.53%
KS	1044153.6	No (0.227)	-54490677.22	No (0.511)	No	0.98	N/A	0.99%
KY	181675.5854	No (0.321)	-30427791.27	No (0.127)	No	0.98	N/A	1.19%
LA	333672.1098	No (0.319)	-12373717.63	No (0.435)	No	0.86	N/A	2.13%
MA	-329927.0167	No (0.213)	4164015.521	No (0.563)	No	0.98	N/A	0.64%
MD	-1145220.102	No (0.145)	62181745.39	No (0.459)	No	0.97	N/A	0.77%
ME	-1128650.889	No (0.158)	50522652.57	No (0.297)	No	0.98	N/A	1.39%
MI	-2813459.063	Yes (< 0.001)	68782248.88	No (0.433)	No	0.97	N/A	1.70%
MN	-384135.9275	No (0.299)	-3375840.029	No (0.492)	No	1.00	N/A	0.99%
MO	-675822.5508	No (0.199)	37169096.71	No (0.497)	No	0.98	N/A	1.49%
MS	154718.3801	No (0.293)	-2802258.577	No (0.162)	No	0.99	N/A	3.11%
MT	-2648126.217	Yes (0.022)	97356267.86	Yes (0.036)	No	0.91	N/A	1.36%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-1823604.705	Yes (0.024)	58290084.98	Yes (0.023)	No	0.99	N/A	2.00%
ND	-1693234.447	No (0.191)	47480174.92	No (0.235)	No	0.92	N/A	0.40%
NE	311505.046	No (0.375)	-24438627.82	No (0.132)	No	0.99	N/A	1.15%
NH	1195362.759	No (0.106)	-50942831.78	No (0.177)	No	0.99	N/A	0.33%
NJ	3404703.36	No (0.5)	-267171146.9	No (0.528)	No	0.99	N/A	0.73%
NM	-4691476.12	Yes (0.036)	145071826.8	Yes (0.023)	No	0.94	N/A	1.49%
NV	-459229.699	No (0.167)	31474186.65	No (0.136)	No	0.90	N/A	0.97%
NY	4746802.049	No (0.177)	-140799929	No (0.508)	No	0.98	N/A	1.57%
OH	-4901577.967	Yes (0.008)	182341039.5	Yes (0.023)	No	0.97	N/A	1.59%
OK	384380.4049	No (0.157)	-24909867.39	No (0.461)	No	0.97	N/A	1.07%
OR	-6880554.217	Yes (0.032)	227087514.6	Yes (0.01)	No	0.93	N/A	1.33%
PA	-239032.9946	No (0.395)	42524747.72	No (0.477)	No	0.99	N/A	1.16%
RI	-129902.843	No (0.381)	-1424824.386	No (0.434)	No	0.98	N/A	0.61%
SC	199577.4145	No (0.34)	-4818465.242	No (0.233)	No	1.00	N/A	3.13%
SD	-11084394	Yes (0.03)	626875343.3	Yes (< 0.001)	No	0.98	N/A	0.69%
TN	-3639411.411	No (0.349)	110645928.9	No (0.56)	No	0.99	N/A	1.72%
TX	-842568.3565	No (0.442)	19173039.41	No (0.287)	No	0.97	N/A	1.10%
US	-4725736.86	No (0.563)	140893046.3	No (0.388)	No	0.99	N/A	1.38%
UT	-2230149.766	No (0.47)	51767895.46	No (0.169)	No	0.95	N/A	1.27%
VA	-7361156.111	No (0.437)	357430805.6	No (0.101)	No	0.98	N/A	1.16%
VT	1575962.611	Yes (0.011)	-95075557.23	No (0.267)	No	0.98	N/A	0.58%
WA	-1838751.604	Yes (0.022)	54954920.43	Yes (0.026)	No	0.95	N/A	1.82%
WI	-690907.6337	No (0.597)	19119341.98	No (0.14)	No	0.96	N/A	1.10%
WV	-1603883.363	No (0.188)	68035353.49	No (0.247)	No	0.99	N/A	1.12%
WY	-238815.0676	No (0.11)	3823911.689	No (0.338)	No	0.92	N/A	3.04%

Table 10
Regression Results on Total Highway Expenditure (1976-2005)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-657827.4513	No (0.548)	-10731649.44	No (0.55)	No	0.77	N/A	3.05%
AL	-1851826.832	Yes (0.018)	68246473.22	Yes (0.018)	No	0.99	N/A	1.16%
AR	-64711.44034	No (0.32)	4565423.768	No (0.318)	No	0.99	N/A	1.28%
AZ	545357.0227	No (0.392)	-20196689.4	No (0.186)	No	0.90	N/A	0.98%
CA	-4512534.642	No (0.173)	360194598.7	No (0.481)	No	0.96	N/A	0.75%
CO	-4200957.683	No (0.314)	171863425.4	No (0.113)	No	0.91	N/A	1.03%
CT	-1040759.579	No (0.243)	72164036.58	No (0.435)	No	0.99	N/A	0.65%
DC	-4454562.814	Yes (0.022)	693504303.5	No (0.205)	No	0.97	N/A	0.10%
DE	-9960218.643	Yes (0.018)	409176017.7	Yes (0.027)	No	0.98	N/A	1.08%
FL	190350.8867	No (0.594)	-13452043.97	No (0.414)	No	0.98	N/A	1.19%
GA	284824.6552	No (0.352)	-16142226.82	No (0.295)	No	0.98	N/A	0.53%
HI	673384.3909	No (0.331)	-2557346.092	No (0.185)	No	0.85	N/A	0.85%
IA	-5110163.519	Yes (0.025)	127792629.2	Yes (0.028)	No	0.97	N/A	1.52%
ID	-3411301.852	Yes (0.02)	91715343.53	No (0.495)	No	0.95	N/A	1.49%
IL	-5172723.401	Yes (0.009)	237239390.9	Yes (0.021)	No	0.99	N/A	0.95%
IN	-6193766.025	No (0.36)	315413685.5	No (0.186)	No	0.96	N/A	0.97%
KS	-183161.1884	No (0.548)	5280385.734	No (0.207)	No	0.96	N/A	1.62%
KY	-75186.14622	No (0.447)	2354970.815	No (0.486)	No	0.98	N/A	1.18%
LA	-739864.7501	No (0.312)	23469195.75	No (0.273)	No	0.83	N/A	0.99%
MA	-4236676.197	Yes (0.018)	228854956.3	Yes (0.006)	No	0.98	N/A	0.74%
MD	1731597.064	Yes (0.004)	-52809126	No (0.269)	No	0.99	N/A	0.92%
ME	-1184714.614	No (0.428)	32133639	No (0.482)	No	0.98	N/A	1.57%
MI	584036.2149	No (0.395)	-9781482.836	No (0.196)	No	0.93	N/A	0.98%
MN	-8613152.415	Yes (0.018)	261851552.7	Yes (0.013)	No	0.98	N/A	1.23%
MO	-2433201.56	No (0.492)	111768041.1	No (0.206)	No	0.98	N/A	1.13%
MS	7417.109515	No (0.326)	221948.0411	No (0.379)	No	0.99	N/A	1.64%
MT	-836393.1799	No (0.289)	15103167.86	No (0.529)	No	0.87	N/A	2.16%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-3368576.678	Yes (0.028)	163689507.4	Yes (0.019)	No	0.99	N/A	1.01%
ND	-1309656.085	No (0.446)	27003901.23	No (0.184)	No	0.85	N/A	2.09%
NE	-2594297.841	No (0.212)	84988800.27	No (0.353)	No	0.98	N/A	1.42%
NH	-68712.10893	No (0.515)	4069428.486	No (0.376)	No	0.99	N/A	0.99%
NJ	-551940.4846	No (0.418)	52883307.64	No (0.233)	No	0.99	N/A	0.73%
NM	-718914.1811	No (0.118)	15436358.22	No (0.183)	No	0.90	N/A	1.39%
NV	**7581254.761**	**Yes (0.018)**	**-279599513.3**	**Yes (0.029)**	**Yes**	**0.91**	**1.36%**	**1.41%**
NY	267123.7469	No (0.367)	-51471386.02	No (0.514)	No	0.98	N/A	0.92%
OH	-6555306.163	No (0.542)	334162488.8	No (0.246)	No	0.97	N/A	1.00%
OK	-3974471.519	Yes (0.012)	144368826.8	Yes (0.012)	No	0.92	N/A	1.09%
OR	-14401175.49	Yes (0.019)	524650613.4	Yes (0.025)	No	0.91	N/A	1.18%
PA	-1324734.088	No (0.11)	63156384.97	No (0.3)	No	0.98	N/A	1.40%
RI	524808.579	No (0.39)	-25642904.32	No (0.379)	No	0.98	N/A	0.86%
SC	-1355114.065	No (0.502)	71319397.58	Yes (0.023)	No	1.00	N/A	1.18%
SD	301034.5911	No (0.286)	1183052.16	No (0.141)	No	0.96	N/A	2.08%
TN	-2120503.103	Yes (0.035)	71937383.97	Yes (0.029)	No	0.99	N/A	0.85%
TX	386583.6233	No (0.378)	-18796741.92	No (0.165)	No	0.96	N/A	1.00%
US	-4158344.889	No (0.138)	198217896.8	No (0.247)	No	0.98	N/A	1.01%
UT	1210804.438	No (0.443)	-31735101.11	No (0.259)	No	0.94	N/A	1.06%
VA	-1500810.52	Yes (0.028)	58024454.97	Yes (0.032)	No	0.98	N/A	0.84%
VT	-2146359.521	Yes (0.023)	51631905.85	Yes (0.013)	No	0.98	N/A	1.58%
WA	-2745227.656	No (0.103)	103377279.5	No (0.499)	No	0.94	N/A	1.02%
WI	363809.2776	No (0.506)	8667723.287	No (0.368)	No	0.97	N/A	1.39%
WV	124711.9813	No (0.18)	-1381014.956	No (0.262)	No	0.99	N/A	1.96%
WY	-881035.0336	No (0.395)	17908059.61	No (0.352)	No	0.92	N/A	1.92%

Table 11
Regression Results on Police and Fire Departments Expenditure (1976-2005)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	1177969.148	No (0.41)	-96740279.83	No (0.329)	No	0.59	N/A	1.29%
AL	-1081069.193	Yes (0.005)	49106332.19	No (0.332)	No	0.99	N/A	1.18%
AR	-961890.9924	Yes (0.005)	54371054.58	Yes (0.018)	No	0.99	N/A	1.28%
AZ	-3512405.605	No (0.245)	99875372.59	No (0.324)	No	0.93	N/A	1.70%
CA	-651959.6537	No (0.362)	1520470.925	No (0.317)	No	0.97	N/A	1.73%
CO	-6566389.031	Yes (0.033)	241783224.6	No (0.209)	No	0.96	N/A	1.22%
CT	-1540085.138	No (0.483)	73288822.94	No (0.458)	No	0.98	N/A	0.95%
DC	-7275049.082	Yes (0.028)	248822210.6	Yes (0.023)	No	0.98	N/A	0.93%
DE	-4181171.799	No (0.461)	223995412.5	No (0.262)	No	0.97	N/A	0.85%
FL	98804.35764	No (0.236)	-18448031.54	No (0.267)	No	0.99	N/A	1.75%
GA	-934508.5917	No (0.588)	1596258.187	No (0.439)	No	0.99	N/A	1.21%
HI	**7546375.188**	**Yes (0.028)**	**-427011969.2**	**Yes (0.005)**	**Yes**	**0.81**	**0.88%**	**1.02%**
IA	-5661133.968	Yes (0.019)	280236361.7	Yes (0.022)	No	0.98	N/A	0.88%
ID	-2524849.884	Yes (0.022)	111347088.6	Yes (0.014)	No	0.97	N/A	1.34%
IL	-3892920.69	Yes (0.017)	202401881.8	Yes (0.013)	No	0.99	N/A	1.25%
IN	-5034710.643	Yes (0.016)	309782957.2	Yes (0.029)	No	0.98	N/A	1.10%
KS	-1717291.459	Yes (0.013)	58396032.66	No (0.592)	No	0.99	N/A	1.12%
KY	-740894.7631	No (0.476)	19340582.69	No (0.562)	No	0.98	N/A	1.13%
LA	**590001.3565**	**No (0.165)**	**-48165014.82**	**Yes (0.022)**	**Yes**	**0.88**	**0.61%**	**1.35%**
MA	-7238074.913	No (0.102)	300241764.9	No (0.156)	No	0.98	N/A	1.10%
MD	344628.7549	No (0.488)	-27603807.87	No (0.227)	No	0.97	N/A	1.47%
ME	-4761012.14	Yes (0.022)	265126382.5	Yes (0.04)	No	0.99	N/A	1.12%
MI	-903371.3827	No (0.486)	-13757806.86	No (0.257)	No	0.96	N/A	1.44%
MN	-1575685.646	No (0.175)	-10955619.58	No (0.432)	No	0.98	N/A	0.95%
MO	-1966838.995	Yes (0.035)	124174500.1	Yes (0.027)	No	0.98	N/A	1.19%
MS	612070.4593	No (0.466)	-26442058.05	No (0.314)	No	0.99	N/A	1.35%
MT	-1440730.4	Yes (0.003)	71173255.42	Yes (0.018)	No	0.89	N/A	1.33%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-442182.1133	No (0.502)	-11950543.83	No (0.514)	No	0.99	N/A	1.11%
ND	-9513881.559	Yes (0.022)	617338162.8	Yes (0.007)	No	0.91	N/A	0.79%
NE	-2327826.369	Yes (0.04)	150891188.6	Yes (0.03)	No	0.99	N/A	0.99%
NH	-5152451.523	Yes (0.013)	256221958.8	Yes (0.017)	No	0.99	N/A	1.03%
NJ	-1612812.579	No (0.348)	50674904.75	No (0.129)	No	0.99	N/A	1.28%
NM	-2864638.604	Yes (0.018)	80993480.07	Yes (0.019)	No	0.96	N/A	1.61%
NV	4148166.43	No (0.431)	-144260921.1	No (0.46)	No	0.90	N/A	1.55%
NY	-1654655.803	No (0.233)	45344696.93	No (0.222)	No	0.98	N/A	1.53%
OH	-3586166.197	Yes (0.026)	153128179	Yes (0.016)	No	0.98	N/A	1.33%
OK	-2281331.444	Yes (0.032)	88893029.08	Yes (0.028)	No	0.96	N/A	1.29%
OR	-6816731.647	Yes (0.012)	254113020.1	Yes (0.001)	No	0.91	N/A	1.48%
PA	-2833440.748	Yes (0.034)	154679952.1	Yes (0.029)	No	0.99	N/A	1.19%
RI	-2269621.242	No (0.224)	69069146.17	No (0.418)	No	0.99	N/A	1.64%
SC	-907927.7477	Yes (< 0.001)	44109581.9	Yes (0.017)	No	1.00	N/A	1.14%
SD	-6811183.165	Yes (0.018)	362843987	No (0.291)	No	0.97	N/A	0.92%
TN	-1017402.018	No (0.584)	29432440.38	No (0.518)	No	0.99	N/A	1.11%
TX	-2432759.624	Yes (0.024)	96843012	Yes (0.027)	No	0.99	N/A	1.07%
US	-1993932.639	Yes (0.02)	51894855.97	No (0.165)	No	0.99	N/A	1.34%
UT	-3746713.292	Yes (0.006)	216263394.8	Yes (0.025)	No	0.96	N/A	1.27%
VA	**2304963.192**	**No (0.572)**	**-187724134**	**Yes (0.023)**	**Yes**	**0.99**	**0.61%**	**1.15%**
VT	-3628540.255	Yes (0.024)	211097900.7	Yes (0.022)	No	0.99	N/A	1.19%
WA	-1723606.866	No (0.433)	39440522.8	No (0.13)	No	0.95	N/A	1.30%
WI	-3866305.944	Yes (0.009)	160198330.8	Yes (0.016)	No	0.98	N/A	1.42%
WV	-228403.9443	No (0.135)	14818633.25	No (0.422)	No	0.99	N/A	1.03%
WY	-725809.966	No (0.342)	31116095.91	No (0.177)	No	0.92	N/A	1.57%

Table 12
Regression Results on Interest Expenditure (1976-2005)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	932147.8241	Yes (0.017)	-14357180.96	No (0.133)	No	0.60	N/A	1.04%
AL	-1427064.068	No (0.565)	87547487.57	No (0.528)	No	0.99	N/A	0.64%
AR	-692389.2966	No (0.514)	34045695.62	No (0.221)	No	0.99	N/A	0.53%
AZ	-745488.2314	No (0.116)	19206803.36	No (0.409)	No	0.96	N/A	0.63%
CA	**2772002.823**	**Yes (0.039)**	**-255194789.4**	**Yes (0.022)**	**Yes**	**0.97**	**0.54%**	**0.76%**
CO	55072.93734	No (0.206)	-33133518.18	No (0.322)	No	0.98	N/A	0.81%
CT	6800273.706	No (0.336)	-374579424.4	No (0.203)	No	0.99	N/A	0.76%
DC	-4712774.739	Yes (0.017)	246442687.1	Yes (0.028)	No	0.97	N/A	0.37%
DE	-1737274.772	Yes (0.021)	62977838.48	No (0.105)	No	0.98	N/A	0.45%
FL	-555878.5009	No (0.116)	23179957.88	No (0.495)	No	0.98	N/A	0.81%
GA	1023062.974	No (0.51)	-81470474.42	No (0.187)	No	0.98	N/A	0.46%
HI	-1004469.771	No (0.442)	20262987.05	No (0.152)	No	0.78	N/A	0.97%
IA	-2909030.455	Yes (0.013)	208858728.2	Yes (0.04)	No	0.99	N/A	0.41%
ID	-1976251.496	Yes (0.02)	95010286.03	No (0.448)	No	0.99	N/A	0.54%
IL	-1718900.665	Yes (0.027)	75127396.42	No (0.393)	No	0.99	N/A	0.85%
IN	-3123484.979	Yes (0.007)	206518752.6	No (0.536)	No	0.99	N/A	0.64%
KS	-1781561.563	Yes (0.031)	96733898.54	Yes (0.001)	No	0.98	N/A	0.75%
KY	1241716.851	No (0.365)	-62447556.4	No (0.594)	No	0.98	N/A	0.92%
LA	-201162.5454	No (0.267)	9511387.023	No (0.194)	No	0.82	N/A	0.70%
MA	-896325.0985	No (0.278)	65554202.32	No (0.188)	No	0.98	N/A	1.25%
MD	-4714715.843	Yes (0.012)	273804087.8	Yes (0.021)	No	0.98	N/A	0.58%
ME	-520474.6502	No (0.422)	29273738.9	No (0.495)	No	0.98	N/A	0.77%
MI	-5449715.306	No (0.375)	353967993.6	No (0.459)	No	0.94	N/A	0.75%
MN	-2447752.503	Yes (0.038)	108606990.3	Yes (0.025)	No	0.98	N/A	0.70%
MO	127794.885	No (0.557)	-37146772.81	No (0.258)	No	0.98	N/A	0.66%
MS	1039254.921	No (0.24)	-72421291.4	No (0.129)	No	0.99	N/A	0.64%
MT	-834648.1063	Yes (0.017)	27329762.41	Yes (0.016)	No	0.96	N/A	0.68%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-1082598.876	No (0.47)	72369907.6	No (0.317)	No	0.99	N/A	0.45%
ND	-1710700.519	Yes (0.021)	63160878.67	Yes (0.025)	No	0.97	N/A	0.65%
NE	-939816.483	Yes (0.014)	30804410.9	No (0.364)	No	0.99	N/A	0.54%
NH	646788.0429	No (0.232)	-38291031.97	No (0.11)	No	0.99	N/A	0.80%
NJ	-2132871.42	No (0.53)	139726286.4	No (0.449)	No	0.99	N/A	0.63%
NM	-506924.7421	No (0.535)	7680196.573	No (0.125)	No	0.95	N/A	0.66%
NV	507953.6276	No (0.357)	-37897205.35	No (0.14)	No	0.90	N/A	0.78%
NY	-5738939.048	Yes (0.016)	206397746.8	Yes (0.019)	No	0.99	N/A	1.06%
OH	-2913470.246	No (0.4)	192648639	No (0.209)	No	0.98	N/A	0.68%
OK	-5260.351133	No (0.543)	-15973769.48	No (0.36)	No	0.93	N/A	0.55%
OR	-1523221.825	No (0.138)	41385632.42	No (0.296)	No	0.94	N/A	0.79%
PA	-1395861.807	No (0.363)	47795754.46	No (0.268)	No	0.99	N/A	0.92%
RI	-718290.1464	No (0.596)	28013040.03	No (0.369)	No	0.98	N/A	0.75%
SC	-134809.6502	No (0.386)	6352179.489	No (0.144)	No	0.99	N/A	0.93%
SD	-750775.4641	Yes (0.028)	18843485.23	No (0.235)	No	0.99	N/A	0.51%
TN	-979219.4954	No (0.501)	50730712.9	No (0.403)	No	0.99	N/A	0.49%
TX	-1074381.479	Yes (0.025)	42149991.55	No (0.454)	No	0.98	N/A	0.66%
US	-1098751.744	No (0.305)	47052930.16	No (0.162)	No	0.99	N/A	0.74%
UT	-358638.6716	Yes (0.031)	7995998.528	Yes (< 0.001)	No	0.97	N/A	0.79%
VA	1525173.524	No (0.537)	-170923231.4	No (0.35)	No	0.99	N/A	0.52%
VT	-1088549.909	No (0.506)	47136198.94	No (0.515)	No	0.98	N/A	0.74%
WA	-2259385.495	Yes (0.013)	74138864.79	Yes (0.027)	No	0.97	N/A	0.84%
WI	-2379349.441	No (0.524)	118629799.1	No (0.383)	No	0.98	N/A	0.72%
WV	77770.13181	No (0.401)	-7744032.233	No (0.507)	No	0.99	N/A	0.72%
WY	-171222.6038	No (0.355)	10748660.3	No (0.577)	No	0.91	N/A	0.31%

Table 13
Regression Results on Total Expenditure (1976-2000)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-46734.92709	No (0.441)	-259100.9162	No (0.132)	No	0.68	N/A	25.45%
AL	-158356.4201	Yes (0.017)	393546.6825	Yes (0.014)	No	1.00	N/A	21.96%
AR	-461656.6723	Yes (0.018)	1554652.524	Yes (0.049)	No	0.99	N/A	19.80%
AZ	-544170.9832	No (0.398)	1259596.897	No (0.428)	No	0.93	N/A	18.51%
CA	570235.7435	No (0.191)	-1662141.305	No (0.421)	No	0.96	N/A	21.32%
CO	-166047.6412	No (0.21)	198620.9024	No (0.463)	No	0.94	N/A	16.36%
CT	604719.7784	No (0.581)	-1979127.299	No (0.326)	No	0.98	N/A	15.32%
DC	-118117.955	No (0.284)	459636.9582	No (0.322)	No	0.96	N/A	10.72%
DE	-1695721.783	Yes (0.004)	5715575.653	Yes (0.028)	No	0.97	N/A	13.39%
FL	**426503.1793**	**Yes (0.008)**	**-1304003.459**	**Yes (0.022)**	**Yes**	**0.99**	**16.35%**	**19.63%**
GA	**2353646.63**	**Yes (0.014)**	**-7857945.669**	**Yes (0.011)**	**Yes**	**0.99**	**14.98%**	**16.44%**
HI	25262.73121	No (0.429)	198832.5482	No (0.417)	No	0.84	N/A	19.23%
IA	-605911.359	No (0.408)	1479631.645	No (0.184)	No	0.97	N/A	18.27%
ID	-830047.6995	Yes (0.021)	2482031.959	Yes (0.007)	No	0.94	N/A	19.43%
IL	365164.9653	No (0.582)	-1228373.798	No (0.155)	No	0.98	N/A	17.59%
IN	-270715.4543	No (0.479)	597208.8379	No (0.288)	No	0.97	N/A	17.79%
KS	-193238.5119	No (0.388)	341828.0676	No (0.24)	No	0.98	N/A	18.01%
KY	72860.93827	No (0.199)	-267489.0613	No (0.2)	No	0.97	N/A	19.45%
LA	**149855.5372**	**No (0.468)**	**-546761.4571**	**Yes (0.024)**	**Yes**	**0.87**	**13.70%**	**18.06%**
MA	-934450.4465	Yes (0.019)	2608469.667	Yes (0.028)	No	0.98	N/A	18.53%
MD	-886020.146	No (0.56)	2503878.902	No (0.372)	No	0.98	N/A	16.93%
ME	-172447.3244	No (0.532)	437986.099	No (0.267)	No	0.97	N/A	22.73%
MI	348585.7999	No (0.347)	-1147869.57	No (0.529)	No	0.93	N/A	20.42%
MN	**792011.754**	**Yes (0.028)**	**-2296476.696**	**Yes (0.008)**	**Yes**	**0.98**	**17.24%**	**18.55%**
MO	-401281.375	No (0.165)	1473004.752	No (0.223)	No	0.97	N/A	17.29%
MS	-46525.48139	No (0.167)	122481.5615	No (0.333)	No	0.99	N/A	25.12%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
MT	-262077.4441	Yes (0.005)	556817.3357	No (0.119)	No	0.93	N/A	21.43%
NC	269272.6196	No (0.146)	-983307.2772	No (0.339)	No	0.98	N/A	17.32%
ND	-239855.6015	Yes (0.003)	471464.8168	No (0.293)	No	0.94	N/A	19.23%
NE	-1267946.9	No (0.147)	3095057.599	No (0.496)	No	0.98	N/A	19.84%
NH	-391670.6072	Yes (0.004)	1265318.477	Yes (0.014)	No	0.99	N/A	16.04%
NJ	-169583.487	No (0.36)	647963.1754	No (0.499)	No	0.98	N/A	18.67%
NM	-563151.5041	Yes (0.019)	1324426.989	No (0.187)	No	0.89	N/A	22.38%
NV	-906992.6312	No (0.445)	2645790.887	No (0.358)	No	0.87	N/A	15.80%
NY	**645437.4567**	**Yes (0.028)**	**-1487722.034**	**Yes (0.026)**	**Yes**	**0.98**	**21.69%**	**23.61%**
OH	-8381.494584	No (0.509)	-254795.6662	No (0.346)	No	0.97	N/A	20.79%
OK	-23669.54817	No (0.191)	-83319.94806	No (0.285)	No	0.95	N/A	18.10%
OR	-2088637.884	No (0.209)	4658714.844	No (0.372)	No	0.83	N/A	20.51%
PA	-138842.6408	No (0.376)	487454.045	No (0.228)	No	0.99	N/A	20.88%
RI	-248231.059	No (0.438)	581698.2953	No (0.496)	No	0.98	N/A	21.15%
SC	142044.8623	No (0.106)	-412059.8511	No (0.343)	No	0.99	N/A	23.56%
SD	-2312312.533	No (0.531)	6709302.953	No (0.336)	No	0.97	N/A	16.28%
TN	75838.96656	No (0.341)	-281390.9323	No (0.427)	No	0.99	N/A	18.98%
TX	129094.7298	No (0.522)	-572063.2486	No (0.567)	No	0.96	N/A	15.36%
US	**863060.1587**	**Yes (0.007)**	**-2577587.652**	**Yes (0.022)**	**Yes**	**0.99**	**16.74%**	**19.18%**
UT	-900402.9254	Yes (0.034)	2136917.343	Yes (0.012)	No	0.94	N/A	19.54%
VA	732689.8156	No (0.229)	-2784063.181	No (0.118)	No	0.99	N/A	14.69%
VT	-1328207.257	Yes (0.018)	3273737.164	Yes (0.021)	No	0.98	N/A	22.46%
WA	-522350.1933	No (0.579)	1110961.297	No (0.215)	No	0.92	N/A	20.56%
WI	-589807.8844	No (0.517)	1381650.892	No (0.536)	No	0.96	N/A	19.88%
WV	-193646.7545	Yes (0.014)	506931.7777	Yes (0.005)	No	0.98	N/A	22.83%
WY	15909.90596	No (0.126)	-80170.60152	No (0.592)	No	0.84	N/A	20.62%

Table 14

Regression Results on Current Expenditure (1976-2000)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	84101.61885	No (0.258)	-618851.8674	No (0.308)	No	0.63	N/A	21.80%
AL	-194243.5461	Yes (0.008)	529557.5792	Yes (0.029)	No	1.00	N/A	19.27%
AR	-635251.9532	Yes (0.017)	2275991.853	Yes (0.033)	No	0.99	N/A	17.86%
AZ	-77870.75952	No (0.25)	-37556.96205	No (0.41)	No	0.94	N/A	15.70%
CA	582887.8964	No (0.169)	-1896666.777	No (0.505)	No	0.96	N/A	18.97%
CO	646779.5163	No (0.589)	-2902357.441	No (0.5)	No	0.96	N/A	13.94%
CT	676881.4841	No (0.426)	-2588127.162	No (0.272)	No	0.98	N/A	14.02%
DC	-2243436.787	No (0.376)	10104307.92	No (0.376)	No	0.96	N/A	9.17%
DE	-2263414.615	Yes (0.009)	8738507.77	Yes (0.029)	No	0.97	N/A	11.54%
FL	**492969.1452**	**Yes (0.02)**	**-1811861.029**	**Yes (0.022)**	**Yes**	**0.99**	**13.60%**	**16.86%**
GA	1266397.32	No (0.381)	-5237280.714	No (0.328)	No	0.99	N/A	14.40%
HI	729312.125	No (0.57)	-2487323.342	No (0.226)	No	0.77	N/A	17.45%
IA	-634717.5972	No (0.212)	1693482.592	No (0.407)	No	0.98	N/A	15.72%
ID	-1029491.948	Yes (0.022)	3523107.644	Yes (0.014)	No	0.95	N/A	17.05%
IL	625229.8205	No (0.116)	-2395359.785	No (0.408)	No	0.98	N/A	15.66%
IN	-428345.245	No (0.334)	1184790.39	No (0.217)	No	0.98	N/A	15.84%
KS	-171543.1143	No (0.418)	248970.8719	No (0.335)	No	0.99	N/A	15.77%
KY	-188574.5885	No (0.526)	432686.0804	No (0.211)	No	0.97	N/A	17.59%
LA	**139378.9437**	**No (0.258)**	**-573836.3237**	**Yes (0.017)**	**Yes**	**0.87**	**12.14%**	**16.13%**
MA	-1107165.133	Yes (0.039)	3439876.26	Yes (0.023)	No	0.98	N/A	16.85%
MD	-357784.9732	No (0.432)	997933.6396	No (0.338)	No	0.98	N/A	15.17%
ME	-307684.1826	No (0.398)	819842.8837	No (0.456)	No	0.97	N/A	21.09%
MI	155575.4004	No (0.349)	-843628.8507	No (0.492)	No	0.95	N/A	18.49%
MN	**623155.9641**	**No (0.478)**	**-2195361.778**	**Yes (0.009)**	**Yes**	**0.99**	**14.19%**	**16.32%**
MO	-286822.5609	No (0.126)	1159017.457	No (0.398)	No	0.97	N/A	15.43%
MS	-264141.4952	No (0.259)	660888.9863	No (0.555)	No	0.99	N/A	22.92%
MT	-173229.3467	No (0.3)	345023.1864	No (0.515)	No	0.95	N/A	18.79%
NC	-25450.10005	No (0.586)	-145440.5986	No (0.383)	No	0.98	N/A	15.25%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
ND	-207123.5274	Yes (0.01)	406919.2988	No (0.193)	No	0.96	N/A	16.48%
NE	123548.6107	No (0.504)	-669666.3395	No (0.272)	No	0.99	N/A	16.83%
NH	-246677.8866	Yes (0.012)	804526.0564	Yes (0.013)	No	0.99	N/A	14.57%
NJ	-405559.213	No (0.197)	1475587.735	No (0.36)	No	0.98	N/A	16.82%
NM	-659509.3657	Yes (0.022)	1861121.317	Yes (0.03)	No	0.89	N/A	20.04%
NV	-1390953.618	No (0.432)	4886392.83	No (0.43)	No	0.89	N/A	12.89%
NY	**711154.2905**	**Yes (0.024)**	**-1839318.007**	**Yes (0.033)**	**Yes**	**0.98**	**19.33%**	**20.87%**
OH	-159190.4808	No (0.305)	81440.86986	No (0.151)	No	0.98	N/A	18.52%
OK	-54572.861	No (0.442)	5602.072567	No (0.168)	No	0.96	N/A	16.15%
OR	-1815823.501	Yes (< 0.001)	4477814.229	Yes (0.023)	No	0.89	N/A	18.35%
PA	94328.52953	No (0.557)	-197422.2292	No (0.199)	No	0.98	N/A	18.81%
RI	-370584.3548	Yes (0.011)	916751.088	Yes (0.009)	No	0.99	N/A	19.83%
SC	201453.3559	No (0.409)	-656735.3864	No (0.425)	No	0.99	N/A	20.64%
SD	-865212.1534	No (0.138)	2648453.78	No (0.376)	No	0.97	N/A	13.67%
TN	-1324936.845	No (0.152)	4198573.676	No (0.479)	No	0.99	N/A	17.36%
TX	161366.8067	No (0.397)	-880515.427	No (0.149)	No	0.97	N/A	12.97%
US	**828824.649**	**Yes (0.023)**	**-2835554.437**	**Yes (0.016)**	**Yes**	**0.99**	**14.61%**	**16.94%**
UT	3309.863022	No (0.506)	-252343.4548	No (0.293)	No	0.96	N/A	16.93%
VA	1523541.005	No (0.562)	-6650408.27	No (0.146)	No	0.99	N/A	13.02%
VT	-1532164.377	Yes (0.013)	4165219.049	Yes (0.002)	No	0.98	N/A	20.79%
WA	-282452.9373	No (0.564)	421627.6238	No (0.54)	No	0.97	N/A	17.24%
WI	-990405.5836	No (0.191)	2619534.669	No (0.207)	No	0.97	N/A	17.90%
WV	-293027.0275	Yes (0.009)	770613.5152	Yes (0.017)	No	0.99	N/A	20.55%
WY	7420.679522	No (0.573)	-40920.30415	No (0.59)	No	0.83	N/A	17.12%

Table 15

Regression Results on Capital Outlays (1976-2000)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-3014959.403	Yes (0.025)	32583779.9	Yes (0.027)	No	0.53	N/A	3.65%
AL	98101.20424	No (0.316)	-1980112.325	No (0.524)	No	0.99	N/A	2.69%
AR	14902.47798	No (0.297)	838408.87	No (0.577)	No	0.99	N/A	1.94%
AZ	85143.06327	No (0.476)	-1762381.762	No (0.323)	No	0.85	N/A	2.81%
CA	524117.3212	No (0.447)	-15468639.12	No (0.559)	No	0.95	N/A	2.35%
CO	-3023341.018	Yes (0.02)	51510980.25	No (0.295)	No	0.92	N/A	2.42%
CT	-439985.0953	No (0.294)	21896328.8	No (0.215)	No	0.99	N/A	1.31%
DC	226323.5935	No (0.475)	-2498511.485	No (0.375)	No	0.96	N/A	1.56%
DE	-2087736.36	No (0.552)	58599293.27	No (0.432)	No	0.96	N/A	1.85%
FL	-252878.2023	No (0.593)	6103122.632	No (0.197)	No	0.98	N/A	2.77%
GA	906512.9953	No (0.124)	-18464041.55	No (0.509)	No	0.97	N/A	2.04%
HI	182021.531	No (0.28)	-76222.60832	No (0.331)	No	0.95	N/A	1.79%
IA	599335.0511	No (0.586)	-8673712.266	No (0.315)	No	0.95	N/A	2.54%
ID	-2494922.84	No (0.486)	46036529.5	No (0.15)	No	0.94	N/A	2.37%
IL	-2273830.709	No (0.185)	62033199.42	No (0.306)	No	0.98	N/A	1.93%
IN	-2799512.774	No (0.265)	84335054.58	No (0.549)	No	0.95	N/A	1.95%
KS	175106.4619	No (0.363)	-3378697.04	No (0.286)	No	0.96	N/A	2.23%
KY	183688.6169	No (0.296)	-2662976.97	No (0.179)	No	0.97	N/A	1.86%
LA	-238880.1156	No (0.538)	5303426.013	No (0.424)	No	0.80	N/A	1.94%
MA	-1875643.762	No (0.346)	46537917.17	No (0.252)	No	0.97	N/A	1.68%
MD	514723.1964	No (0.468)	-8905633.963	No (0.41)	No	0.97	N/A	1.75%
ME	81914.00514	No (0.425)	665141.8436	No (0.121)	No	0.98	N/A	1.64%
MI	-1060358.863	No (0.474)	34144185.86	No (0.155)	No	0.93	N/A	1.92%
MN	-1798817.723	No (0.503)	32956031.05	No (0.423)	No	0.96	N/A	2.23%
MO	-1637412.756	No (0.202)	46474779.77	No (0.103)	No	0.97	N/A	1.86%
MS	-260995.9612	No (0.461)	5904080.626	No (0.472)	No	0.99	N/A	2.20%
MT	696262.3161	No (0.156)	-12306669.9	No (0.374)	No	0.81	N/A	2.64%
NC	-673414.5798	No (0.451)	17494808.52	No (0.214)	No	0.98	N/A	2.07%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
ND	-1678193.064	No (0.56)	28458795.94	No (0.492)	No	0.83	N/A	2.75%
NE	220486.595	No (0.121)	-1683541.176	No (0.565)	No	0.99	N/A	3.01%
NH	-39878.64925	No (0.336)	2395835.14	No (0.489)	No	0.98	N/A	1.47%
NJ	-40772.64148	No (0.428)	7546599.129	No (0.556)	No	0.98	N/A	1.85%
NM	1617150.352	No (0.276)	-33974178.51	No (0.347)	No	0.86	N/A	2.34%
NV	-1364166.95	No (0.135)	25276226.02	No (0.203)	No	0.86	N/A	2.91%
NY	594565.4538	No (0.254)	-9780607.929	No (0.127)	No	0.98	N/A	2.73%
OH	-2944093.111	Yes (0.005)	83190241.57	Yes (0.027)	No	0.97	N/A	2.27%
OK	999891.4246	No (0.382)	-21479500.64	No (0.574)	No	0.88	N/A	1.95%
OR	1936091.837	No (0.591)	-30272334.3	No (0.559)	No	0.87	N/A	2.15%
PA	-151485.4332	No (0.246)	7119613.326	No (0.116)	No	0.99	N/A	2.07%
RI	86709.21249	No (0.415)	399033.3996	No (0.239)	No	0.98	N/A	1.32%
SC	50602.53777	No (0.163)	-810482.6951	No (0.522)	No	0.99	N/A	2.93%
SD	543303.4176	No (0.338)	-7321265.191	No (0.437)	No	0.97	N/A	2.61%
TN	-459111.5024	No (0.356)	9616515.1	No (0.314)	No	0.99	N/A	1.62%
TX	310778.2158	No (0.167)	-5732890.473	No (0.417)	No	0.96	N/A	2.38%
US	-1752691.601	No (0.129)	42168408.6	No (0.128)	No	0.99	N/A	2.24%
UT	**409390.3604**	**Yes (0.003)**	**-3897316.581**	**Yes (< 0.001)**	**Yes**	**0.91**	**5.25%**	**2.62%**
VA	-173439.8636	No (0.288)	4393995.634	No (0.465)	No	0.98	N/A	1.67%
VT	-9661.060008	No (0.347)	-1776407.03	No (0.586)	No	0.97	N/A	1.67%
WA	-134876.7282	No (0.157)	2376683.12	No (0.487)	No	0.90	N/A	3.33%
WI	-820678.9368	No (0.342)	24224171.75	No (0.482)	No	0.95	N/A	1.99%
WV	69575.00284	No (0.234)	60843.07549	No (0.138)	No	0.98	N/A	2.28%
WY	-565060.553	No (0.1)	6508072.785	No (0.397)	No	0.88	N/A	3.51%

Table 16
Regression Results on Total Education Expenditure (1976-2000)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-935984.7951	No (0.256)	1403359.473	No (0.183)	No	0.84	N/A	5.99%
AL	-381153.7462	No (0.514)	3330037.174	No (0.146)	No	0.99	N/A	6.53%
AR	-709212.287	No (0.18)	6636893.661	No (0.45)	No	0.99	N/A	6.76%
AZ	-2352712.624	Yes (0.008)	18479725.43	Yes (0.029)	No	0.94	N/A	5.12%
CA	-1307727.545	No (0.512)	14005007.86	No (0.245)	No	0.96	N/A	5.48%
CO	-4081584.314	Yes (0.015)	35547328.13	Yes (0.02)	No	0.96	N/A	4.72%
CT	-1444426.377	No (0.439)	19016211.38	No (0.244)	No	0.98	N/A	4.72%
DC	2576050.399	No (0.214)	-51221035.49	No (0.207)	No	0.96	N/A	1.70%
DE	-3885236.243	Yes (0.019)	37562699.48	Yes (0.016)	No	0.98	N/A	4.29%
FL	-1149233.353	No (0.577)	11806981.68	No (0.35)	No	0.98	N/A	4.81%
GA	-809233.0085	No (0.544)	8368901.465	No (0.328)	No	0.97	N/A	5.56%
HI	-1345473.213	No (0.323)	15645344.68	No (0.434)	No	0.74	N/A	4.84%
IA	-2619589.811	No (0.423)	20149083.78	No (0.514)	No	0.96	N/A	6.17%
ID	-1826599.67	No (0.175)	15792798.48	No (0.226)	No	0.93	N/A	6.05%
IL	-2656500.362	No (0.255)	30997619.25	No (0.255)	No	0.99	N/A	5.14%
IN	-598323.6207	No (0.179)	3607363.893	No (0.349)	No	0.96	N/A	6.18%
KS	186045.9136	No (0.332)	-3084776.992	No (0.519)	No	0.98	N/A	5.98%
KY	534651.3663	No (0.414)	-5997675.311	No (0.415)	No	0.97	N/A	5.95%
LA	555407.7578	No (0.15)	-7397428.49	No (0.201)	No	0.85	N/A	4.98%
MA	-1677992.256	Yes (0.005)	18538074.25	Yes (0.031)	No	0.97	N/A	5.01%
MD	-988288.301	No (0.458)	8257187.534	No (0.203)	No	0.98	N/A	5.54%
ME	-761990.38	No (0.161)	7295324.794	No (0.557)	No	0.98	N/A	6.38%
MI	-301259.7228	No (0.294)	1768196.305	No (0.472)	No	0.92	N/A	7.30%
MN	-2717120.722	No (0.31)	22175989.28	No (0.223)	No	0.97	N/A	5.27%
MO	-1862349.858	No (0.231)	20993111.77	No (0.291)	No	0.97	N/A	5.24%
MS	-199190.8912	No (0.219)	1363624.03	No (0.367)	No	0.99	N/A	7.35%
MT	-358343.6009	No (0.549)	1948695.463	No (0.53)	No	0.87	N/A	6.65%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-6719552.506	No (0.471)	65173638.22	No (0.225)	No	0.98	N/A	5.33%
ND	-44663.51621	No (0.357)	-1243923.78	No (0.587)	No	0.97	N/A	6.42%
NE	513137.5379	No (0.515)	-6861173.165	No (0.483)	No	0.98	N/A	5.72%
NH	-1274554.134	Yes (0.018)	13756466.09	Yes (0.005)	No	0.99	N/A	5.35%
NJ	-1310766.116	No (0.252)	13121838.87	No (0.29)	No	0.98	N/A	6.22%
NM	-204706.5153	No (0.32)	434567.69	No (0.463)	No	0.83	N/A	7.00%
NV	**2835174.892**	**No (0.56)**	**-38611309.06**	**Yes (0.021)**	**Yes**	**0.90**	**3.67%**	**4.07%**
NY	-303501.5291	No (0.513)	3249555.276	No (0.496)	No	0.98	N/A	5.60%
OH	-595389.2933	No (0.321)	4970233.582	No (0.321)	No	0.95	N/A	6.22%
OK	-889167.3914	Yes (0.024)	7280257.476	Yes (0.027)	No	0.94	N/A	6.22%
OR	-5311473.566	No (0.133)	38320110.15	No (0.187)	No	0.89	N/A	5.56%
PA	-1115248.85	Yes (0.027)	11659345.62	Yes (0.027)	No	0.99	N/A	6.21%
RI	-1942179.968	No (0.564)	17393417.52	No (0.25)	No	0.98	N/A	5.77%
SC	-513875.624	No (0.184)	4679422.457	No (0.106)	No	0.99	N/A	6.97%
SD	-564580.5504	No (0.369)	4799416.536	No (0.565)	No	0.97	N/A	4.98%
TN	-2395321.32	No (0.284)	27384754.56	No (0.186)	No	0.99	N/A	4.60%
TX	-589865.3088	No (0.212)	6900672.577	No (0.288)	No	0.96	N/A	5.34%
US	-4302038.01	Yes (0.029)	42987048.87	Yes (0.009)	No	0.99	N/A	5.57%
UT	-8575513.5	Yes (0.023)	61920379.53	Yes (0.022)	No	0.93	N/A	6.25%
VA	-5382588.095	Yes (0.029)	54934714.05	Yes (0.022)	No	0.99	N/A	5.01%
VT	-101304.8516	No (0.404)	1147172.951	No (0.193)	No	0.97	N/A	8.26%
WA	2494245.273	No (0.424)	-23427172.48	No (0.284)	No	0.91	N/A	5.35%
WI	-737337.0833	No (0.428)	4843323.545	No (0.295)	No	0.95	N/A	6.36%
WV	-880321.3111	Yes (0.02)	6681557.413	Yes (0.032)	No	0.99	N/A	7.38%
WY	-98224.15771	No (0.508)	639860.3904	No (0.472)	No	0.84	N/A	5.77%

Table 17

Regression Results on Secondary Education Expenditure (1976-2000)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-1051071.432	No (0.333)	1427835.065	No (0.589)	No	0.82	N/A	4.39%
AL	-521084.8817	Yes (0.026)	7538909.272	Yes (0.026)	No	1.00	N/A	3.84%
AR	-809527.253	No (0.378)	11616651.69	No (0.167)	No	0.99	N/A	4.42%
AZ	-3813898.94	Yes (< 0.001)	46868879.36	Yes (0.035)	No	0.93	N/A	3.27%
CA	-1976720.004	Yes (0.02)	31290863.1	Yes (0.021)	No	0.96	N/A	3.82%
CO	-6636655.269	Yes (0.021)	87044074.78	Yes (0.002)	No	0.96	N/A	3.23%
CT	-1056027.834	No (0.416)	18795175.02	No (0.384)	No	0.98	N/A	3.50%
DC	3527275.771	No (0.503)	-93970289.79	No (0.569)	No	0.96	N/A	1.58%
DE	-5457194.382	Yes (0.027)	90556918.93	Yes (0.025)	No	0.98	N/A	2.56%
FL	-531700.5804	No (0.191)	7335884.366	No (0.426)	No	0.98	N/A	3.50%
GA	1435022.836	No (0.566)	-24045685.35	No (0.521)	No	0.97	N/A	3.96%
HI	-1298534.31	No (0.519)	24342697.6	No (0.588)	No	0.73	N/A	3.16%
IA	-4766934.688	No (0.578)	61205089.59	No (0.537)	No	0.95	N/A	3.72%
ID	-2099132.843	No (0.55)	27985371.48	No (0.438)	No	0.93	N/A	3.88%
IL	-3280974.585	Yes (0.013)	54725948.62	Yes (0.026)	No	0.99	N/A	3.57%
IN	-788308.4775	No (0.251)	6604476.647	No (0.128)	No	0.96	N/A	4.08%
KS	324459.1856	No (0.541)	-7826175.455	No (0.536)	No	0.98	N/A	3.61%
KY	40569.17508	No (0.551)	-934401.8609	No (0.155)	No	0.97	N/A	3.57%
LA	**1003560.605**	**No (0.38)**	**-19077996.95**	**Yes (0.027)**	**Yes**	**0.86**	**2.63%**	**3.26%**
MA	-1535627.716	Yes (0.015)	21391495.65	Yes (< 0.001)	No	0.97	N/A	3.44%
MD	-653763.0025	No (0.266)	7268016.267	No (0.27)	No	0.98	N/A	3.67%
ME	-859998.3933	No (0.138)	11076724.2	No (0.534)	No	0.98	N/A	4.57%
MI	-825672.1788	No (0.424)	8969007.751	No (0.355)	No	0.91	N/A	4.98%
MN	-891518.2795	No (0.405)	8421954.482	No (0.481)	No	0.97	N/A	3.62%
MO	-415650.1532	No (0.518)	4740371.636	No (0.599)	No	0.97	N/A	3.65%
MS	-117485.9728	No (0.137)	993296.2653	No (0.414)	No	0.99	N/A	4.44%
MT	158941.8463	No (0.437)	-3310528.455	No (0.238)	No	0.91	N/A	4.18%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-1683314.324	No (0.409)	25206378.49	No (0.355)	No	0.98	N/A	3.06%
ND	-72376.78558	No (0.146)	-3317845.742	No (0.593)	No	0.95	N/A	3.67%
NE	-1683420.105	No (0.207)	19361482.14	No (0.191)	No	0.98	N/A	3.60%
NH	-2026763.696	Yes (0.005)	30660745.53	Yes (0.026)	No	0.98	N/A	3.94%
NJ	-1593763.315	No (0.217)	20401807.98	No (0.336)	No	0.98	N/A	4.90%
NM	2383080.549	No (0.105)	-33219155.24	No (0.411)	No	0.84	N/A	4.26%
NV	896045.9316	No (0.389)	-18955012.48	No (0.563)	No	0.88	N/A	2.99%
NY	1019079.065	No (0.596)	-12263349.31	No (0.411)	No	0.98	N/A	4.41%
OH	-324737.7545	No (0.543)	2469488.173	No (0.175)	No	0.95	N/A	4.32%
OK	-625916.5913	No (0.482)	5898357.695	No (0.533)	No	0.95	N/A	3.87%
OR	-5294082.693	No (0.299)	54926616.97	No (0.457)	No	0.93	N/A	3.45%
PA	-1215209.759	No (0.181)	16839650.06	No (0.229)	No	0.98	N/A	4.27%
RI	-116177.4434	No (0.264)	948794.2066	No (0.154)	No	0.98	N/A	4.22%
SC	-82679.06227	No (0.565)	1848592.296	No (0.253)	No	0.99	N/A	4.56%
SD	-3413537.901	No (0.535)	41873975.96	No (0.234)	No	0.97	N/A	3.34%
TN	-2651711.631	No (0.155)	47628128.04	No (0.586)	No	0.99	N/A	3.11%
TX	-792524.7087	No (0.491)	13304341.39	No (0.313)	No	0.96	N/A	3.66%
US	-5326562.233	Yes (0.014)	76639516.78	Yes (0.006)	No	0.99	N/A	3.83%
UT	-7614300.512	Yes (0.004)	88432215.37	Yes (0.028)	No	0.96	N/A	3.52%
VA	-5888653.125	Yes (0.021)	88557099.11	Yes (0.03)	No	0.99	N/A	3.44%
VT	738134.0587	No (0.352)	-7480616.985	No (0.21)	No	0.97	N/A	5.22%
WA	1870466.304	No (0.505)	-27354708.45	No (0.266)	No	0.91	N/A	3.33%
WI	-4451766.824	No (0.166)	52182817.74	No (0.595)	No	0.95	N/A	4.13%
WV	-1370891.106	Yes (0.017)	14832408.3	Yes (0.013)	No	0.98	N/A	4.60%
WY	-113767.1519	No (0.199)	713231.6	No (0.224)	No	0.84	N/A	3.76%

Table 18
Regression Results on Higher Education Expenditure (1976-2000)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-16320425.4	No (0.197)	546084633.9	No (0.436)	No	0.71	N/A	1.39%
AL	-439091.6788	No (0.148)	8647597.14	No (0.25)	No	1.00	N/A	2.31%
AR	37526.26799	No (0.478)	-104861.195	No (0.57)	No	0.98	N/A	1.96%
AZ	-2473710.487	No (0.321)	56508318.4	No (0.544)	No	0.89	N/A	1.62%
CA	**4614371.788**	**Yes (0.026)**	**-148288504**	**Yes (0.02)**	**Yes**	**0.97**	**1.56%**	**1.44%**
CO	-6145996.356	No (0.428)	172358911.9	No (0.207)	No	0.92	N/A	1.36%
CT	-33121088.06	No (0.566)	2316263167	No (0.259)	No	0.98	N/A	1.01%
DC	1601568.299	No (0.203)	479861163.6	No (0.469)	No	0.97	N/A	0.12%
DE	-4553767.542	No (0.181)	103531776.8	No (0.582)	No	0.97	N/A	1.44%
FL	-1041468.976	No (0.356)	45631884.04	No (0.381)	No	0.98	N/A	1.07%
GA	-6114275.126	No (0.187)	296544137.4	No (0.129)	No	0.97	N/A	1.24%
HI	-2501563.783	No (0.528)	81622528.92	No (0.288)	No	0.74	N/A	1.61%
IA	-4739580.645	Yes (0.028)	103180991.8	Yes (0.01)	No	0.97	N/A	2.15%
ID	-659355.5175	No (0.309)	10694030.27	No (0.2)	No	0.93	N/A	1.88%
IL	-3698317.716	No (0.587)	167136031.6	No (0.208)	No	0.98	N/A	1.33%
IN	-5385076.383	Yes (0.028)	156901715.3	No (0.164)	No	0.96	N/A	1.79%
KS	-1654249.315	No (0.511)	39442482.93	No (0.342)	No	0.97	N/A	2.17%
KY	1646902.96	No (0.196)	-57877029.78	No (0.137)	No	0.97	N/A	1.85%
LA	2049890.257	No (0.225)	-101594783.1	No (0.51)	No	0.84	N/A	1.32%
MA	-8816443.061	No (0.567)	738173506.9	No (0.181)	No	0.98	N/A	0.97%
MD	-9134860.232	Yes (0.011)	311132842.2	Yes (0.01)	No	0.99	N/A	1.58%
ME	2966262.867	No (0.359)	-99834368.35	No (0.589)	No	0.97	N/A	1.49%
MI	-4100438.661	No (0.294)	104768941.1	No (0.243)	No	0.93	N/A	2.12%
MN	-5934393.604	No (0.242)	188634743.6	No (0.257)	No	0.96	N/A	1.35%
MO	-2796286.892	No (0.404)	147846603.8	No (0.235)	No	0.98	N/A	1.35%
MS	-357228.9738	No (0.294)	8417964.488	No (0.517)	No	0.99	N/A	2.54%
MT	-1138472.25	Yes (0.032)	34325043.74	Yes (0.023)	No	0.86	N/A	2.05%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-30458700.15	Yes (< 0.001)	904731523.4	Yes (0.037)	No	0.98	N/A	2.11%
ND	-670413.7538	No (0.139)	4831750.523	No (0.273)	No	0.96	N/A	2.54%
NE	-5978255.939	Yes (0.016)	163410212	Yes (0.038)	No	0.98	N/A	1.91%
NH	-2318209.663	Yes (0.012)	97846471.73	Yes (0.013)	No	0.99	N/A	1.24%
NJ	22008329.86	No (0.505)	-1197907558	No (0.305)	No	0.98	N/A	1.12%
NM	-2545472.043	No (0.58)	50625779.71	No (0.206)	No	0.85	N/A	2.45%
NV	**18384801.86**	**Yes (0.02)**	**-1007038255**	**Yes (0.032)**	**Yes**	**0.95**	**0.91%**	**0.96%**
NY	-7647432.554	No (0.525)	404203088.9	No (0.5)	No	0.98	N/A	0.98%
OH	-4254883.786	No (0.417)	142051637.4	No (0.485)	No	0.96	N/A	1.53%
OK	-4972662.879	Yes (< 0.001)	150220105.8	Yes (0.024)	No	0.93	N/A	2.06%
OR	-18901066.69	No (0.397)	529990867.8	No (0.143)	No	0.78	N/A	1.92%
PA	5094.550753	No (0.349)	7301416.254	No (0.472)	No	0.98	N/A	1.35%
RI	-4399566.563	No (0.102)	156150964.4	No (0.443)	No	0.98	N/A	1.18%
SC	1498209.806	No (0.418)	-50949485.75	No (0.329)	No	0.99	N/A	1.86%
SD	1710055.39	No (0.351)	-42458631.03	No (0.325)	No	0.98	N/A	1.39%
TN	**6504286.149**	**Yes (0.029)**	**-266095315.5**	**Yes (0.011)**	**Yes**	**0.99**	**1.22%**	**1.22%**
TX	-570539.3159	No (0.392)	25119457.82	No (0.284)	No	0.96	N/A	1.51%
US	-6943771.38	No (0.498)	275951658.1	No (0.502)	No	0.98	N/A	1.47%
UT	-1765027.282	No (0.35)	36533406.97	No (0.133)	No	0.88	N/A	2.47%
VA	14911738.62	No (0.519)	-562910845.1	No (0.188)	No	0.98	N/A	1.39%
VT	-8494651.647	No (0.303)	195685703.8	No (0.294)	No	0.97	N/A	2.54%
WA	-13097659.71	Yes (0.036)	397043442.4	Yes (0.025)	No	0.92	N/A	1.67%
WI	-15244487.41	Yes (0.037)	393897333.5	No (0.115)	No	0.96	N/A	2.02%
WV	-913515.6233	Yes (0.005)	30212624.43	Yes (0.008)	No	0.98	N/A	2.07%
WY	-790206.6002	No (0.179)	26619458.53	No (0.296)	No	0.84	N/A	1.74%

Table 19
Regression Results on Public Welfare Expenditure (1976-2000)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-3334665.225	Yes (0.021)	34868352.23	No (0.183)	No	0.80	N/A	3.50%
AL	-199422.593	Yes (0.024)	4594576.011	Yes (0.021)	No	1.00	N/A	3.33%
AR	-751003.8687	Yes (0.007)	16927711.96	Yes (0.007)	No	0.99	N/A	3.80%
AZ	-713590.3584	Yes (0.029)	12451387.76	Yes (0.016)	No	0.95	N/A	2.78%
CA	1557974.674	No (0.383)	-40523021.84	No (0.21)	No	0.97	N/A	2.74%
CO	129052.2676	No (0.181)	-15842180.04	No (0.375)	No	0.92	N/A	1.51%
CT	-902921.7257	No (0.259)	11528719.54	No (0.393)	No	0.99	N/A	2.25%
DC	5332947.19	No (0.596)	-137247708.7	No (0.164)	No	0.96	N/A	2.13%
DE	1260796.891	No (0.506)	-54156036.35	No (0.34)	No	0.96	N/A	1.98%
FL	64169.90821	No (0.545)	-6810496.925	No (0.224)	No	0.99	N/A	2.65%
GA	-248351.6788	No (0.575)	1941998.514	No (0.481)	No	0.98	N/A	2.46%
HI	1607079.991	No (0.476)	-48245817.95	No (0.355)	No	0.79	N/A	2.63%
IA	-2775741.477	Yes (0.017)	56511713.48	Yes (0.024)	No	0.97	N/A	2.75%
ID	-1862094.851	Yes (0.004)	64513789.87	Yes (0.029)	No	0.98	N/A	3.06%
IL	**2720315.096**	**Yes (0.024)**	**-71780514.02**	**Yes (0.008)**	**Yes**	**0.99**	**1.89%**	**2.37%**
IN	-2080003.227	Yes (0.017)	43576627.1	Yes (0.002)	No	0.99	N/A	2.54%
KS	619280.9574	No (0.549)	-27139326.24	No (0.164)	No	0.98	N/A	2.63%
KY	-156928.9023	No (0.134)	2594563.085	No (0.213)	No	0.97	N/A	3.91%
LA	-329373.7956	No (0.457)	5455834.668	No (0.186)	No	0.84	N/A	2.49%
MA	-1614707.246	No (0.165)	26355581.28	No (0.406)	No	0.97	N/A	3.37%
MD	-1914897.457	No (0.508)	41903613.16	No (0.101)	No	0.98	N/A	2.44%
ME	-824404.511	Yes (0.012)	8613654.834	Yes (0.027)	No	0.99	N/A	5.20%
MI	-2283115.637	No (0.186)	40248444.85	No (0.104)	No	0.93	N/A	2.70%
MN	-383277.9742	No (0.218)	1483555.311	No (0.3)	No	0.97	N/A	3.93%
MO	-482985.4052	No (0.215)	10889777.83	No (0.456)	No	0.97	N/A	2.95%
MS	-196296.6765	No (0.158)	3808017.082	No (0.569)	No	0.99	N/A	5.10%
MT	-1050120.887	Yes (0.04)	19195320.69	Yes (0.015)	No	0.94	N/A	2.69%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-844989.8132	Yes (0.012)	25471613.5	Yes (0.017)	No	0.98	N/A	2.75%
ND	-919009.1706	Yes (0.036)	14049765.42	Yes (0.024)	No	0.94	N/A	2.86%
NE	-1438139.452	Yes (0.009)	34954128.77	Yes (0.024)	No	0.99	N/A	2.80%
NH	-224429.6297	Yes (< 0.001)	3245647.268	No (0.365)	No	0.98	N/A	3.00%
NJ	196586.3104	No (0.169)	-3920246.312	No (0.129)	No	0.98	N/A	2.62%
NM	-620717.455	No (0.473)	25294348.69	Yes (0.02)	No	0.94	N/A	4.53%
NV	-3196808.943	No (0.42)	154581154.7	No (0.397)	No	0.87	N/A	1.49%
NY	**1352580.724**	**Yes (0.004)**	**-20659489.45**	**Yes (0.014)**	**Yes**	**0.99**	**3.27%**	**4.44%**
OH	-688901.3065	No (0.466)	7235369.524	No (0.236)	No	0.98	N/A	3.46%
OK	-142542.8698	No (0.504)	555797.6307	No (0.593)	No	0.92	N/A	3.10%
OR	-1178570.439	No (0.231)	42012204.41	No (0.384)	No	0.86	N/A	2.68%
PA	704569.4723	Yes (0.008)	-11800679.44	No (0.513)	No	0.99	N/A	4.20%
RI	-1454619.967	Yes (0.028)	21420095.24	Yes (0.019)	No	0.99	N/A	4.77%
SC	-76427.137	No (0.437)	1614249.163	No (0.187)	No	0.99	N/A	3.71%
SD	-494103.5578	No (0.592)	16925541.2	No (0.305)	No	0.97	N/A	2.44%
TN	-4185.292504	No (0.534)	1517836.273	No (0.224)	No	0.99	N/A	3.84%
TX	-11335.5254	No (0.251)	-2262084.953	No (0.55)	No	0.96	N/A	1.96%
US	**1611861.062**	**Yes (0.023)**	**-39299364.61**	**Yes (0.027)**	**Yes**	**0.99**	**2.05%**	**2.93%**
UT	-3058260.946	Yes (0.018)	87352381.06	Yes (0.031)	No	0.91	N/A	2.52%
VA	540461.2749	No (0.52)	-29190222.98	No (0.247)	No	0.99	N/A	1.92%
VT	-221640.0482	No (0.24)	2051050.514	No (0.477)	No	0.98	N/A	4.90%
WA	-902405.2537	No (0.476)	17933285.74	No (0.334)	No	0.91	N/A	2.49%
WI	331129.4193	No (0.472)	-13592014.98	No (0.125)	No	0.98	N/A	3.23%
WV	-136597.1127	No (0.189)	2863570.465	Yes (0.006)	No	0.99	N/A	4.41%
WY	490145.5706	No (0.515)	-23723531.16	No (0.254)	No	0.85	N/A	2.03%

Table 20

Regression Results on Financial Administration Expenditure (1976-2000)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-5398156.218	No (0.133)	95944290.07	No (0.116)	No	0.69	N/A	0.57%
AL	-522780.9071	No (0.4)	64354139.68	No (0.346)	No	0.99	N/A	0.28%
AR	-2635548.261	No (0.332)	250950750.5	Yes (0.008)	No	0.99	N/A	0.50%
AZ	2002897.566	No (0.333)	-167848641.1	No (0.518)	No	0.91	N/A	0.31%
CA	-222303.193	No (0.502)	44365603.94	No (0.11)	No	0.95	N/A	0.37%
CO	-8068534.161	No (0.124)	458214969.9	No (0.446)	No	0.93	N/A	0.29%
CT	**11132711.35**	**Yes (0.044)**	**-731624940**	**Yes (0.018)**	**Yes**	**0.98**	**0.76%**	**0.28%**
DC	5939499.584	No (0.357)	-895551186.7	No (0.388)	No	0.97	N/A	0.23%
DE	-15453031.39	No (0.372)	902460849.6	No (0.251)	No	0.97	N/A	0.39%
FL	**4152231.091**	**Yes (0.026)**	**-286185436.5**	**Yes (0.012)**	**Yes**	**0.98**	**0.73%**	**0.40%**
GA	-10779958.82	No (0.158)	1088678006	No (0.152)	No	0.97	N/A	0.20%
HI	-11512672.68	No (0.36)	772756562	No (0.453)	No	0.81	N/A	0.24%
IA	-15683167.33	Yes (0.016)	1051263116	Yes (0.014)	No	0.98	N/A	0.27%
ID	-4434312.241	No (0.164)	295358662.2	No (0.554)	No	0.96	N/A	0.46%
IL	-6943486.199	No (0.522)	668822695.5	Yes (0.012)	No	0.99	N/A	0.28%
IN	-8914479.534	Yes (0.018)	634787494	Yes (0.026)	No	0.99	N/A	0.29%
KS	-3513498.405	Yes (< 0.001)	211259617.3	Yes (0.017)	No	0.97	N/A	0.26%
KY	-2481854.54	No (0.113)	183069018	No (0.189)	No	0.97	N/A	0.28%
LA	884886.4916	No (0.118)	-126798258.4	No (0.14)	No	0.84	N/A	0.31%
MA	-9004672.36	No (0.307)	752485677.2	No (0.3)	No	0.97	N/A	0.24%
MD	**14147743.23**	**Yes (0.008)**	**-1136723260**	**Yes (0.01)**	**Yes**	**0.98**	**0.62%**	**0.28%**
ME	-2823985.589	No (0.466)	191335604.8	No (0.366)	No	0.97	N/A	0.42%
MI	-2291820.747	No (0.396)	-21137401.63	No (0.237)	No	0.95	N/A	0.25%
MN	-1694470.299	No (0.458)	-49925554.91	No (0.439)	No	0.99	N/A	0.25%
MO	-4978843.189	No (0.159)	575887091.1	No (0.517)	No	0.97	N/A	0.24%
MS	-1535508.911	No (0.277)	122412033.1	No (0.257)	No	0.99	N/A	0.32%
MT	-4784207.302	Yes (0.013)	225110348.4	Yes (0.003)	No	0.92	N/A	0.60%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	11500773.52	No (0.174)	-1372215571	No (0.229)	No	0.99	N/A	0.15%
ND	-6660577.577	Yes (0.029)	427431699.9	Yes (0.037)	No	0.88	N/A	0.38%
NE	-22316777.54	No (0.526)	1898239503	No (0.581)	No	0.98	N/A	0.26%
NH	-5129782.188	No (0.344)	396031676.5	No (0.52)	No	0.98	N/A	0.23%
NJ	18507454.08	No (0.413)	-1418751317	No (0.377)	No	0.98	N/A	0.24%
NM	-10438657.48	No (0.347)	532288323	No (0.242)	No	0.87	N/A	0.42%
NV	8718844.378	No (0.293)	-470210288	No (0.416)	No	0.85	N/A	0.26%
NY	-1616716.733	No (0.389)	115857984.9	No (0.505)	No	0.98	N/A	0.29%
OH	-9984570.655	Yes (0.013)	663475618.1	Yes (0.023)	No	0.98	N/A	0.46%
OK	-2022155.211	Yes (< 0.001)	64570151.07	No (0.141)	No	0.97	N/A	0.28%
OR	-20177648.62	No (0.551)	898709310.1	No (0.123)	No	0.82	N/A	0.47%
PA	-11831793.84	Yes (0.028)	959424571.7	Yes (0.013)	No	0.99	N/A	0.26%
RI	3077194.701	No (0.566)	-149093003.9	No (0.191)	No	0.98	N/A	0.41%
SC	-1683082.508	No (0.401)	122719589.1	No (0.286)	No	0.99	N/A	0.54%
SD	2280862.641	No (0.158)	-100072015.5	No (0.11)	No	0.97	N/A	0.34%
TN	-7826406.215	No (0.322)	784683853.6	No (0.317)	No	0.99	N/A	0.22%
TX	340987.4681	No (0.224)	-153450121.8	No (0.133)	No	0.97	N/A	0.17%
US	-3865767.838	No (0.264)	212746224.5	No (0.372)	No	0.99	N/A	0.30%
UT	-12537011.44	Yes (0.011)	772023589.9	Yes (0.011)	No	0.95	N/A	0.42%
VA	1641666.011	No (0.207)	-89651811.52	No (0.141)	No	0.98	N/A	0.26%
VT	-7557862.713	No (0.573)	398760653.9	No (0.105)	No	0.98	N/A	0.33%
WA	-8594997.819	No (0.171)	450065959.3	No (0.139)	No	0.98	N/A	0.24%
WI	-11902046.75	No (0.147)	928312318.8	No (0.434)	No	0.95	N/A	0.22%
WV	-1437065.446	Yes (0.014)	87276923.58	Yes (0.029)	No	0.98	N/A	0.62%
WY	425118.8254	No (0.183)	-39348519.54	No (0.168)	No	0.84	N/A	0.32%

Table 21
Regression Results on Health and Hospital Expenditure (1976-2000)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-4779686.873	No (0.551)	97812875.69	No (0.265)	No	0.59	N/A	0.76%
AL	-110385.0533	No (0.372)	316000.142	No (0.3)	No	1.00	N/A	3.37%
AR	-2489705.693	Yes (0.025)	91591659.84	Yes (0.018)	No	0.99	N/A	1.32%
AZ	-6894091.471	Yes (0.035)	391620150.1	Yes (0.03)	No	0.90	N/A	1.06%
CA	2770219.343	No (0.179)	-114867546.8	No (0.344)	No	0.97	N/A	1.58%
CO	-4405347.383	No (0.226)	157092387.4	No (0.479)	No	0.96	N/A	1.11%
CT	**15668398.61**	**Yes (0.003)**	**-816557802.2**	**Yes (0.006)**	**Yes**	**0.99**	**0.96%**	**0.91%**
DC	-6871759.695	No (0.591)	364648049.6	No (0.464)	No	0.97	N/A	0.77%
DE	7341279.943	No (0.505)	-562506699.5	No (0.492)	No	0.96	N/A	0.65%
FL	1843405.917	No (0.402)	-74328052.03	No (0.163)	No	0.99	N/A	1.40%
GA	-811056.3135	No (0.261)	14438544.99	No (0.536)	No	0.98	N/A	1.39%
HI	**7691881.2**	**Yes (0.019)**	**-310203766**	**Yes (0.019)**	**Yes**	**0.84**	**1.24%**	**1.52%**
IA	-1536471.341	No (0.416)	32969901.15	No (0.397)	No	0.96	N/A	1.89%
ID	-6346934.445	Yes (0.016)	201727806.6	Yes (0.034)	No	0.95	N/A	1.71%
IL	-6868274.591	No (0.12)	422022618.1	No (0.38)	No	0.98	N/A	0.96%
IN	-6463343.457	Yes (0.032)	202880281.4	Yes (0.006)	No	0.98	N/A	1.53%
KS	-10290.94988	No (0.101)	-10208024.51	No (0.477)	No	0.97	N/A	0.99%
KY	4058590.402	No (0.22)	-244634665.3	No (0.145)	No	0.98	N/A	1.19%
LA	-239794.7191	No (0.215)	978519.2415	No (0.274)	No	0.83	N/A	2.13%
MA	-5055520.468	No (0.392)	216666256.5	No (0.293)	No	0.97	N/A	0.64%
MD	-850287.5269	No (0.213)	33402663.31	No (0.355)	No	0.98	N/A	0.77%
ME	-818725.1025	No (0.261)	33840459.7	No (0.138)	No	0.97	N/A	1.39%
MI	235351.9924	No (0.212)	-34454777.5	No (0.4)	No	0.97	N/A	1.70%
MN	-235005.5982	No (0.121)	-8466149.47	No (0.467)	No	1.00	N/A	0.99%
MO	-2672218.239	No (0.246)	117941938.2	No (0.313)	No	0.97	N/A	1.49%
MS	-515114.1757	No (0.462)	8786253.957	No (0.12)	No	0.99	N/A	3.11%
MT	-2346830.344	Yes (0.014)	101649908.6	Yes (0.025)	No	0.90	N/A	1.36%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-1580664.724	Yes (0.01)	52261706.58	Yes (0.03)	No	0.98	N/A	2.00%
ND	-1229297.006	No (0.525)	41980665.77	No (0.558)	No	0.86	N/A	0.40%
NE	-250341.088	No (0.13)	-2076709.387	No (0.595)	No	0.99	N/A	1.15%
NH	1224018.445	No (0.223)	-55605196.74	No (0.284)	No	0.98	N/A	0.33%
NJ	4076978.584	No (0.247)	-303620624.3	No (0.456)	No	0.98	N/A	0.73%
NM	-4741178.907	Yes (0.034)	146960730.8	Yes (0.016)	No	0.87	N/A	1.49%
NV	212131.1479	No (0.192)	4423298.791	No (0.245)	No	0.86	N/A	0.97%
NY	3116928.617	No (0.371)	-88672111.02	No (0.513)	No	0.98	N/A	1.57%
OH	-4163088.314	No (0.562)	150617101	No (0.553)	No	0.96	N/A	1.59%
OK	416895.1865	No (0.409)	-25005879.7	No (0.588)	No	0.92	N/A	1.07%
OR	-8505789.095	Yes (0.026)	310568001	Yes (0.025)	No	0.89	N/A	1.33%
PA	4621946.227	No (0.464)	-237504721.1	No (0.455)	No	0.99	N/A	1.16%
RI	1219586.927	No (0.182)	-59770257.55	No (0.282)	No	0.98	N/A	0.61%
SC	119292.5474	No (0.346)	-3059626.904	No (0.332)	No	0.99	N/A	3.13%
SD	-5631164.288	Yes (0.015)	301204533.5	Yes (0.029)	No	0.99	N/A	0.69%
TN	-2883905.313	No (0.346)	87910829.74	No (0.459)	No	0.99	N/A	1.72%
TX	336287.3226	No (0.299)	-24189574.81	No (0.505)	No	0.96	N/A	1.10%
US	1020506.459	No (0.173)	-63731960.74	No (0.398)	No	0.99	N/A	1.38%
UT	5839508.264	No (0.317)	-328143251	No (0.348)	No	0.94	N/A	1.27%
VA	-9851484.821	No (0.581)	469449845.2	No (0.269)	No	0.98	N/A	1.16%
VT	-45500.92983	No (0.454)	-37230747.48	No (0.307)	No	0.98	N/A	0.58%
WA	-2762876.635	Yes (< 0.001)	91532492.97	Yes (0.021)	No	0.92	N/A	1.82%
WI	-3242377.629	No (0.477)	130404836.3	No (0.412)	No	0.96	N/A	1.10%
WV	-2516037.532	Yes (0.006)	101449335.5	Yes (0.036)	No	0.98	N/A	1.12%
WY	90289.56783	No (0.132)	-4097130.033	No (0.457)	No	0.84	N/A	3.04%

Table 22
Regression Results on Total Highway Expenditure (1976-2000)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	-527939.6332	No (0.325)	-15187603.99	No (0.153)	No	0.72	N/A	3.05%
AL	-741118.5286	No (0.549)	25001556.87	No (0.129)	No	0.99	N/A	1.16%
AR	123158.2471	No (0.424)	-1621026.329	No (0.486)	No	0.99	N/A	1.28%
AZ	366728.7977	No (0.491)	-14213914.48	No (0.53)	No	0.86	N/A	0.98%
CA	-6489827.442	No (0.21)	480024633	No (0.206)	No	0.95	N/A	0.75%
CO	-4032315.864	No (0.371)	148375642.6	No (0.503)	No	0.90	N/A	1.03%
CT	-1187082.164	No (0.27)	78402226.86	No (0.202)	No	0.99	N/A	0.65%
DC	-207143.7819	No (0.362)	96490938.96	No (0.489)	No	0.96	N/A	0.10%
DE	-10681413.04	Yes (0.013)	439722075.5	Yes (0.022)	No	0.98	N/A	1.08%
FL	913831.1963	No (0.192)	-46786570.02	No (0.555)	No	0.98	N/A	1.19%
GA	-643609.0483	No (0.508)	22895004.09	No (0.359)	No	0.97	N/A	0.53%
HI	560230.6149	No (0.379)	3323285.084	No (0.542)	No	0.88	N/A	0.85%
IA	-4607427.027	No (0.174)	115010027.7	No (0.372)	No	0.95	N/A	1.52%
ID	-2540623.031	No (0.44)	65557382.97	No (0.235)	No	0.93	N/A	1.49%
IL	-5679997.922	Yes (0.002)	253013885.1	Yes (0.028)	No	0.99	N/A	0.95%
IN	-5229626.397	No (0.593)	256463083.8	No (0.263)	No	0.95	N/A	0.97%
KS	-974934.8228	No (0.171)	30104762.42	No (0.14)	No	0.96	N/A	1.62%
KY	143700.8643	No (0.416)	-2618919.806	No (0.126)	No	0.97	N/A	1.18%
LA	-401946.5723	No (0.465)	12182586.96	No (0.483)	No	0.81	N/A	0.99%
MA	-3834694.378	No (0.122)	204167001.8	No (0.471)	No	0.97	N/A	0.74%
MD	1449785.233	Yes (0.015)	-44399658.7	No (0.491)	No	0.99	N/A	0.92%
ME	-1099501.653	No (0.45)	28481203.11	No (0.156)	No	0.97	N/A	1.57%
MI	-3776153.1	No (0.276)	182692294.8	No (0.559)	No	0.91	N/A	0.98%
MN	-7133099.487	Yes (0.025)	214021952.2	Yes (0.025)	No	0.97	N/A	1.23%
MO	-2334001.75	No (0.295)	101551509.8	No (0.532)	No	0.97	N/A	1.13%
MS	62023.20587	No (0.573)	-132148.6986	No (0.158)	No	0.99	N/A	1.64%
MT	-149139.6207	No (0.331)	1399971.712	No (0.482)	No	0.80	N/A	2.16%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-4045997.964	Yes (0.022)	185284561.8	Yes (0.026)	No	0.98	N/A	1.01%
ND	-1059970.127	No (0.189)	20211497.44	No (0.476)	No	0.83	N/A	2.09%
NE	-2192746.874	No (0.556)	70974365.99	No (0.139)	No	0.98	N/A	1.42%
NH	-228003.9053	No (0.58)	7531739.357	No (0.338)	No	0.98	N/A	0.99%
NJ	-699443.1095	No (0.324)	60713301.5	No (0.574)	No	0.99	N/A	0.73%
NM	-306480.0112	No (0.161)	7160125.607	No (0.519)	No	0.80	N/A	1.39%
NV	**9621217.065**	**Yes (0.013)**	**-361991819.7**	**Yes (0.005)**	**Yes**	**0.88**	**1.33%**	**1.41%**
NY	-310196.6892	No (0.469)	482984.8777	No (0.307)	No	0.98	N/A	0.92%
OH	-7197417.382	No (0.408)	365883677.6	No (0.497)	No	0.95	N/A	1.00%
OK	-3181970.159	Yes (0.021)	115882920.2	Yes (0.015)	No	0.91	N/A	1.09%
OR	-17150091.57	Yes (0.018)	621468236.4	Yes (0.026)	No	0.84	N/A	1.18%
PA	-1471227.18	No (0.414)	64723942.27	No (0.374)	No	0.98	N/A	1.40%
RI	467420.5487	No (0.412)	-13960626.73	No (0.454)	No	0.98	N/A	0.86%
SC	-1294504.283	No (0.583)	69654591.68	No (0.518)	No	0.99	N/A	1.18%
SD	1417853.296	No (0.283)	-23242918.36	No (0.154)	No	0.98	N/A	2.08%
TN	-2105226.493	Yes (0.018)	71967073.5	Yes (0.031)	No	0.99	N/A	0.85%
TX	-1247062.522	No (0.409)	57902984.47	No (0.116)	No	0.96	N/A	1.00%
US	-6789284.191	Yes (0.015)	293575342	Yes (0.003)	No	0.99	N/A	1.01%
UT	1050192.695	No (0.518)	-25437701.79	No (0.516)	No	0.92	N/A	1.06%
VA	1489711.014	No (0.146)	-58881410.61	No (0.304)	No	0.98	N/A	0.84%
VT	-1026188.545	No (0.384)	24204326.05	No (0.552)	No	0.97	N/A	1.58%
WA	-1989061.045	No (0.191)	75075289.35	No (0.147)	No	0.90	N/A	1.02%
WI	1436663.802	No (0.57)	-29661211.79	No (0.532)	No	0.96	N/A	1.39%
WV	180305.7376	No (0.244)	-2132203.511	No (0.572)	No	0.98	N/A	1.96%
WY	-817548.4322	No (0.483)	16492529.65	No (0.218)	No	0.85	N/A	1.92%

Table 23

Regression Results on Police and Fire Departments Expenditure (1976-2000)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	1131742.524	No (0.468)	-183971863.1	No (0.319)	No	0.62	N/A	1.29%
AL	-449545.0624	No (0.21)	24506625.97	No (0.355)	No	0.99	N/A	1.18%
AR	-1509894.237	Yes (0.028)	92818650.75	Yes (0.034)	No	0.99	N/A	1.28%
AZ	-1713882.998	No (0.327)	42002943.77	No (0.313)	No	0.88	N/A	1.70%
CA	**1973473.707**	**No (0.396)**	**-87358639.78**	**Yes (0.01)**	**Yes**	**0.97**	**1.13%**	**1.73%**
CO	-2749440.215	No (0.372)	74512149.42	No (0.306)	No	0.93	N/A	1.22%
CT	210879.2648	No (0.267)	-31970557.32	No (0.38)	No	0.98	N/A	0.95%
DC	-3303647.873	No (0.48)	119658698.3	No (0.572)	No	0.96	N/A	0.93%
DE	-4897777.701	No (0.181)	282609798.3	No (0.496)	No	0.96	N/A	0.85%
FL	122301.319	No (0.299)	-14732449.61	No (0.304)	No	0.99	N/A	1.75%
GA	-1409881.619	No (0.185)	22198653.96	No (0.343)	No	0.99	N/A	1.21%
HI	**8546276.671**	**Yes (0.01)**	**-499877010.8**	**Yes (0.025)**	**Yes**	**0.82**	**0.85%**	**1.02%**
IA	-4922464.022	Yes (0.018)	260040274.7	No (0.242)	No	0.96	N/A	0.88%
ID	-2269609.728	Yes (0.028)	119690854.8	Yes (0.01)	No	0.97	N/A	1.34%
IL	-3974128.048	Yes (0.018)	214926714.4	Yes (0.019)	No	0.99	N/A	1.25%
IN	-6080289.647	Yes (0.007)	412664281	Yes (0.01)	No	0.97	N/A	1.10%
KS	-1082822.878	No (0.216)	28298538.22	No (0.425)	No	0.98	N/A	1.12%
KY	-864417.8048	No (0.231)	26620964.35	No (0.495)	No	0.97	N/A	1.13%
LA	423720.7842	No (0.504)	-36129687.43	No (0.375)	No	0.84	N/A	1.35%
MA	-5715495.998	No (0.329)	236231246.6	No (0.226)	No	0.97	N/A	1.10%
MD	672033.0034	No (0.455)	-32147084.48	No (0.444)	No	0.97	N/A	1.47%
ME	-4856087.686	Yes (0.036)	271487374.8	Yes (0.01)	No	0.98	N/A	1.12%
MI	1186962.008	No (0.327)	-100257646.8	No (0.46)	No	0.96	N/A	1.44%
MN	148918.148	No (0.299)	-86873655.75	No (0.469)	No	0.97	N/A	0.95%
MO	-2725745.75	No (0.399)	170748853.7	Yes (0.019)	No	0.98	N/A	1.19%
MS	-384911.8362	No (0.567)	23759260.36	No (0.282)	No	0.99	N/A	1.35%
MT	-937886.5008	No (0.151)	55238167.59	Yes (0.029)	No	0.85	N/A	1.33%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-446959.8476	No (0.365)	-6497368.636	No (0.495)	No	0.99	N/A	1.11%
ND	-6936065.65	Yes (0.036)	480125640.8	Yes (0.013)	No	0.88	N/A	0.79%
NE	-2508627.939	Yes (0.029)	178869883.9	Yes (< 0.001)	No	0.98	N/A	0.99%
NH	-5475591.741	Yes (0.016)	275713911.3	Yes (0.025)	No	0.99	N/A	1.03%
NJ	-3152582.066	No (0.192)	113974144.5	No (0.238)	No	0.98	N/A	1.28%
NM	-2865342.453	Yes (0.016)	80658446.93	No (0.313)	No	0.92	N/A	1.61%
NV	5517895.904	No (0.432)	-188351325.5	No (0.542)	No	0.86	N/A	1.55%
NY	-1820197.602	No (0.482)	69317086.35	No (0.173)	No	0.98	N/A	1.53%
OH	-4564062.66	Yes (0.025)	204569432	Yes (0.023)	No	0.97	N/A	1.33%
OK	-1747703.792	Yes (0.012)	72669641.73	Yes (0.031)	No	0.93	N/A	1.29%
OR	-8063352.543	Yes (0.015)	349953563.8	Yes (0.015)	No	0.91	N/A	1.48%
PA	-1930766.859	Yes (0.018)	115640336.4	Yes (0.019)	No	0.99	N/A	1.19%
RI	-821368.048	No (0.565)	17985495.36	No (0.417)	No	0.98	N/A	1.64%
SC	-813642.4502	Yes (0.01)	32903640.41	No (0.444)	No	1.00	N/A	1.14%
SD	-4153850.128	No (0.437)	263424741.1	No (0.192)	No	0.97	N/A	0.92%
TN	-784773.3294	No (0.124)	20549335.19	No (0.526)	No	0.99	N/A	1.11%
TX	-2091036.869	Yes (0.014)	74166398.87	Yes (0.029)	No	0.98	N/A	1.07%
US	-835082.3286	No (0.119)	3159301.123	No (0.176)	No	0.99	N/A	1.34%
UT	-3791101.605	Yes (0.012)	221437359.8	Yes (0.013)	No	0.94	N/A	1.27%
VA	1463481.651	No (0.444)	-114738128.6	No (0.423)	No	0.99	N/A	1.15%
VT	-1825059.726	No (0.426)	91767223.61	No (0.575)	No	0.98	N/A	1.19%
WA	-1675587.041	No (0.244)	38011859.13	No (0.344)	No	0.92	N/A	1.30%
WI	-4081867.384	Yes (0.011)	179627939.7	Yes (0.025)	No	0.97	N/A	1.42%
WV	-1087103.054	No (0.473)	79136423.18	No (0.467)	No	0.98	N/A	1.03%
WY	-154431.3237	No (0.312)	617773.0675	No (0.24)	No	0.84	N/A	1.57%

Table 24
Regression Results on Interest Expenditure (1976-2000)

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
AK	**1297488.065**	**Yes (0.029)**	**-19326110.59**	**Yes (0.016)**	**Yes**	**0.52**	**3.36%**	**1.04%**
AL	-239426.1869	No (0.172)	16364411.6	No (0.157)	No	0.99	N/A	0.64%
AR	-520530.4488	No (0.174)	22202596.42	No (0.15)	No	0.99	N/A	0.53%
AZ	-344132.5773	No (0.244)	4792333.749	No (0.53)	No	0.92	N/A	0.63%
CA	**3128353.261**	**Yes (0.034)**	**-255253626.2**	**Yes (0.026)**	**Yes**	**0.97**	**0.61%**	**0.76%**
CO	-60175.45028	No (0.366)	-28447962.59	No (0.523)	No	0.96	N/A	0.81%
CT	8332089.997	No (0.408)	-462433663.1	No (0.307)	No	0.98	N/A	0.76%
DC	-473064.6535	No (0.362)	-41485188.75	No (0.347)	No	0.96	N/A	0.37%
DE	-2547628.752	No (0.557)	100276575.2	No (0.229)	No	0.97	N/A	0.45%
FL	99199.54164	No (0.416)	-2612793.224	No (0.533)	No	0.98	N/A	0.81%
GA	-1875307.056	No (0.434)	114661850.8	No (0.36)	No	0.97	N/A	0.46%
HI	-1843155.369	No (0.132)	25353930.31	No (0.227)	No	0.91	N/A	0.97%
IA	-2502173.267	Yes (0.014)	172661928.6	Yes (0.014)	No	0.99	N/A	0.41%
ID	-2063923.261	Yes (0.021)	104842971	No (0.146)	No	0.98	N/A	0.54%
IL	-440795.8951	No (0.459)	-31287337.94	No (0.473)	No	0.99	N/A	0.85%
IN	-138234.1138	No (0.296)	-88295144.1	No (0.556)	No	0.98	N/A	0.64%
KS	-1133813.729	No (0.489)	62355040.87	No (0.391)	No	0.97	N/A	0.75%
KY	107873.8394	No (0.493)	-22842851.82	No (0.157)	No	0.98	N/A	0.92%
LA	-174036.3879	No (0.312)	7882137.329	No (0.473)	No	0.80	N/A	0.70%
MA	1832597.909	No (0.498)	-55700745.66	No (0.225)	No	0.97	N/A	1.25%
MD	368265.5339	No (0.328)	-9618995.085	No (0.413)	No	0.97	N/A	0.58%
ME	-493649.4999	No (0.295)	32598396.4	No (0.318)	No	0.97	N/A	0.77%
MI	4039495.565	No (0.498)	-345235434.6	No (0.177)	No	0.92	N/A	0.75%
MN	-1740256.451	No (0.361)	76541006.55	No (0.308)	No	0.96	N/A	0.70%
MO	2438163.686	No (0.432)	-234011552.4	No (0.315)	No	0.97	N/A	0.66%
MS	632860.0601	No (0.144)	-46913881.82	No (0.515)	No	0.99	N/A	0.64%
MT	-604829.789	Yes (0.018)	18846074.15	Yes (0.022)	No	0.91	N/A	0.68%

State	Beta for Expenditure/GSP	Significant at .05 level?	Beta for (Expenditure/GSP)^2	Significant at .05 level?	Armey Curve?	R-Squared	Optimal Expenditure	Expenditure/GSP as of 2005
NC	-420103.3052	No (0.309)	19729070.55	No (0.202)	No	0.98	N/A	0.45%
ND	-636471.1518	No (0.13)	7595912.05	No (0.34)	No	0.94	N/A	0.65%
NE	-925525.4377	Yes (0.023)	30725296.67	No (0.318)	No	0.99	N/A	0.54%
NH	599587.1561	No (0.409)	-40413571.93	No (0.427)	No	0.98	N/A	0.80%
NJ	-5276824.295	Yes (0.014)	315790652.7	Yes (0.016)	No	0.99	N/A	0.63%
NM	-339168.5538	No (0.574)	232475.8758	No (0.161)	No	0.91	N/A	0.66%
NV	336398.124	No (0.564)	-27520644.64	No (0.305)	No	0.86	N/A	0.78%
NY	-3570240.169	No (0.376)	132376378.3	No (0.377)	No	0.98	N/A	1.06%
OH	3861099	No (0.563)	-367457921.3	No (0.586)	No	0.97	N/A	0.68%
OK	515547.0363	No (0.462)	-40365660.17	No (0.46)	No	0.89	N/A	0.55%
OR	-1876959.211	Yes (0.03)	59117379.55	No (0.141)	No	0.90	N/A	0.79%
PA	-1483135.372	No (0.11)	54984866.37	No (0.343)	No	0.99	N/A	0.92%
RI	34775.13855	No (0.349)	-1133246.627	No (0.331)	No	0.98	N/A	0.75%
SC	75716.59038	No (0.365)	-6040601.133	No (0.144)	No	0.99	N/A	0.93%
SD	141134.1385	No (0.525)	-19740579.98	No (0.469)	No	0.99	N/A	0.51%
TN	1796833.767	No (0.125)	-140432196.9	No (0.129)	No	0.99	N/A	0.49%
TX	-553295.0502	No (0.489)	19707867.92	No (0.174)	No	0.97	N/A	0.66%
US	1477327.457	No (0.203)	-90586541.42	No (0.397)	No	0.98	N/A	0.74%
UT	-750057.5754	Yes (0.009)	18776584.42	Yes (0.003)	No	0.97	N/A	0.79%
VA	2469033.891	No (0.306)	-151219799.1	No (0.261)	No	0.99	N/A	0.52%
VT	3102148.19	No (0.446)	-146241797.2	No (0.334)	No	0.97	N/A	0.74%
WA	-2310793.456	Yes (0.023)	76309101.31	Yes (0.003)	No	0.96	N/A	0.84%
WI	-2211315.582	No (0.503)	102560767.4	No (0.241)	No	0.97	N/A	0.72%
WV	-661490.9635	Yes (0.002)	20158881.68	No (0.583)	No	0.99	N/A	0.72%
WY	426605.7577	No (0.411)	-12388922.73	No (0.387)	No	0.85	N/A	0.31%