TAXES AND DEFICITS: AN OBSERVATION ON THE RELATIONSHIP BETWEEN TAXES AND SPENDING

A JOINT ECONOMIC COMMITTEE STUDY

Congressman Jim Saxton (R-NJ),

Ranking Member

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Executive Summary

The historical evidence suggests that the future tax increases embodied in the recently passed Congressional budget resolution would likely be used to finance additional federal spending, not deficit reduction. A statistical analysis of the relevant data in the 1946-2006 period finds that each $1.00 of additional taxes was associated with $1.07 in additional federal spending. This finding indicates that tax increases have been an ineffective and self-defeating approach to reducing budget deficits.

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TAXES AND DEFICITS: AN OBSERVATION ON THE RELATIONSHIP BETWEEN TAXES AND SPENDING

by Richard Vedder, and Jonathan Leirer[1]

In a 1987 Republican Joint Economic Committee study, Vedder, Gallaway and Frenze argued that the econometric evidence for the 1947-86 period suggested that every $1.00 of new federal tax and non-tax revenues was associated with $1.58 in new federal spending, implying that budget deficits rose with increases in the aggregate federal tax rate.[2] A 1991 follow-up study reaches similar conclusions.[3] This study confirms many of the same results.

First, the tax-spending relationship originally observed in 1987, and revisited in 1991, has somewhat diminished with the passage of 16 more years of American federal fiscal history. In other words, the 1991 to 2006 experience suggests that there has been some evidence of attenuation in the high federal marginal propensity to spend new tax revenues. Nonetheless, a statistically significant tendency persists for spending to rise more than one dollar ($1.07) for each one dollar increase in tax revenue, based on the evidence for the past six decades. The data suggest that reducing budget deficits through higher taxation is typically unsuccessful.

Second, the historical evidence from the first administration of President George Washington to the present shows that the federal propensity to spend new tax revenues has grown over time, as the political advantages of new spending have increased. At one time, new taxes were associated with very significant deficit reduction, but not in recent decades.

Third, the findings are better understood by use of a simple cost-benefit theoretical framework of fiscal behavior developed by Dwight Lee of the University of Georgia and Richard Vedder of Ohio University, which draws on the laws of demand and supply. In the context of the findings reported here, the framework reveals that in the postwar era there has been a pronounced increase in the marginal political benefits to spend; put differently, the political demand for spending has increased.

Fourth, the modestly positive relationship between taxation and deficits observed at the federal level is not obtained at the state and local level, suggesting that different institutional arrangements constraining state governments, including balanced budget constitutional amendments, have a real impact on political and thus fiscal behavior. This suggests that those interested in constraining the amount of spending growth to or below the growth in revenues might learn from the experience of the states.

Fifth, the findings cast grave doubt on the efficacy of raising taxes as a means of eliminating fiscal imbalances. Successful implementation of moderation in expenditure growth through greater fiscal discipline is desirable.

I. The Tax, Spending and Deficit Relationship, 1947-2006

Taking data on federal expenditures and federal revenues from the national income accounts for the calendar years 1947 through 2006, we regressed federal tax (largely tax receipts) levels against federal spending levels.[4] As evident below, the statistical results indicate that each $1.00 in tax revenues was associated with $1.07 in expenditures, with the result highly significant statistically. Indeed, the resultant $1.07 is statistically significantly greater from $1.00. [5]

In 1987, Vedder, Gallaway, and Frenze argued that additional variables might affect receipts and expenditures and thus should be incorporated into the analysis for control purposes. For example, receipts and expenditures of the federal government vary with the business cycle. We accordingly introduced a variable measuring real economic growth, Growth, and the rate of joblessness, Unemployment.[6] Similarly, military spending presumably grows with major threats to national security as reflected in wars. Accordingly, we introduced a "war dummy" variable, War. [7] Finally, we introduced a variable for unanticipated inflation, Inflate, defined as inflation in the year in question minus the average of the previous three year's inflation rate.[8] Introducing all of these additional variables makes a negligible difference in the reported tax-spend relationship:

$$\begin{aligned} \text{Spending} = {} & \underset{(-2.93)}{-246.18} + \underset{(34.3839)}{1.07\ \text{Taxes}} + \underset{(2.98)}{46.86\ \text{Unemployment}} \\ & \underset{(-1.29)}{-2.99\ \text{Growth}} + \underset{(2.11)}{91.91\ \text{War}} + \underset{(1.32)}{338.81\ \text{Inflate}} \end{aligned}$$

$$\bar{R}^2 = 0.9890 \quad \text{D-W} = 0.7266 \quad \text{F-Statistic} = 1064.41$$

where the numbers in parentheses are t-statistics. [9] The Taxes, Unemployment, and War variables are all statistically significant, while all the other control variables are not. [10]

We can attribute to this model nearly ninety-nine percent of the variation in spending over time, compared with about two-thirds, and three-fourths in the similar model reported in 1987 and 1991, respectively. The tax-spend relationship has actually diminished slightly, suggesting the propensity to spend out of tax revenues has declined somewhat with time. [11]

It appears as though the brief period of fiscal restraint experienced throughout the 1990s led to a diminished propensity to spend, although that has reversed since 2000. Still the coefficient on the Tax variable is statistically significantly greater than unity, demonstrating the Congress's propensity to increase spending is more than proportional to revenue.[12] These results suggest that, contrary to political rhetoric, new tax revenues are associated with rising, not falling, budget deficits.

II. Disaggregating the Tax-Spend Relationship

Using alternative versions of the model (including, even, somewhat different time periods), the evidence is extremely consistent with the view that increases in tax revenues are associated with even bigger changes in federal spending. Nonetheless, it is possible that the infusion of federal revenues has a differential impact on spending. Have all forms of spending been equally enhanced by increases in tax revenue?

Following standard federal classifications, we divided spending into six categories: purchase of defense goods and services; purchases of non-defense goods and services; transfer payments; grants-in-aid to state and local governments; net interest payments; and "other," a category that primarily includes subsidies to government-owned business enterprises. Using regression analysis, we then looked at the relationship between federal tax (and non-tax) receipts and expenditures in each of these categories over the 1947-90 period. In doing so, we followed the 1991 study, using fiscal year data (because the detailed expenditures were more readily available on that basis) rather than calendar year data as in the 1987 study. [13]

Using the fiscal year data, we observe that each $1.00 in new revenues is associated with $1.07 in new spending, as opposed to $1.57 found in the 1991 study and $1.59 obtained using the calendar year data. Table 1 indicates the tax-spending relationship for each of the six categories of spending outlined above.

Table 1
Estimated Impact of $1.00 Increase in Taxed on Categorical Spending, 1947-2006

Spending Category	Impact of $1.00 increase in Federal Tax Revenues	Statistical Significance
Transfer Payments	+$ 0.61	less than 1 percent*
State and Local Grants-in-Aid†	+$ 0.10	less than 1 percent*
Net Interest Payments	+$ 0.14	less than 1 percent*
Other Spending	+$ 0.09	less than 1 percent*
Defense Goods and Services	+$ 0.15	less than 1 percent*
Non-Defense Good and Services	+$ 0.08	less than 1 percent*
All Spending	+$1.07	less than 1 percent*

* Probability that observed relationship is spurious
† State and Local Grants-in-Aid is a sub-component of Transfer Payments.
Source: National Income and Product Account, Bureau of Economic Analysis, Section 3: Government Current Receipts and Expenditures, Tables 3.2 and 3.10.5.

It is important to note that all spending relationships are positive and statistically significant. The largest of these relationships is between tax revenues and transfer payments. Indeed more than half of the spending increase goes to transfer payments. Similarly, there are important increases in grants-in-aid and interest payments associated with new taxes, and a minor one between taxes and "other" expenditures. The interest-tax relationship is interesting. It implies that: one, increased taxes increased deficits and thus interest payments on the national debt; two, increased taxes served to increase interest rates on government securities (perhaps because higher nominal interest rates are necessary after taxes rise to obtain any given after-tax return), or, three, both of the above factors.

Transfer payments, grants in aid, interest payments, and "other" all involve the redistribution of income. Money received from taxpayers and, through borrowing, from new bondholders, is distributed to individuals, governments, old bondholders, and government enterprises. Together, each $1.00 in new taxes is estimated to be associated with $0.84 in income transfers in one form or another, representing nearly 80 percent of the entire spending increase.

By contrast, new tax revenues are associated with only modest increases in government purchases of goods and services (roughly 21% of the increase in spending can be attributed to goods and services). The smallest observed relationship is between non-defense purchases and taxation. Regarding defense spending, a dollar in new tax revenues is estimated to be associated with an unimpressive 15-cent increase in defense spending.

These results suggest that new tax monies are associated not only with greater deficits but with relative reductions in traditionally provided government services. The results lend support to those who argue that tax increases promote income redistribution, or what some economists call "rent-seeking," the use of political power by special interest groups to obtain added income without a corresponding provision of added labor or capital services.

III. Some Historical Evidence

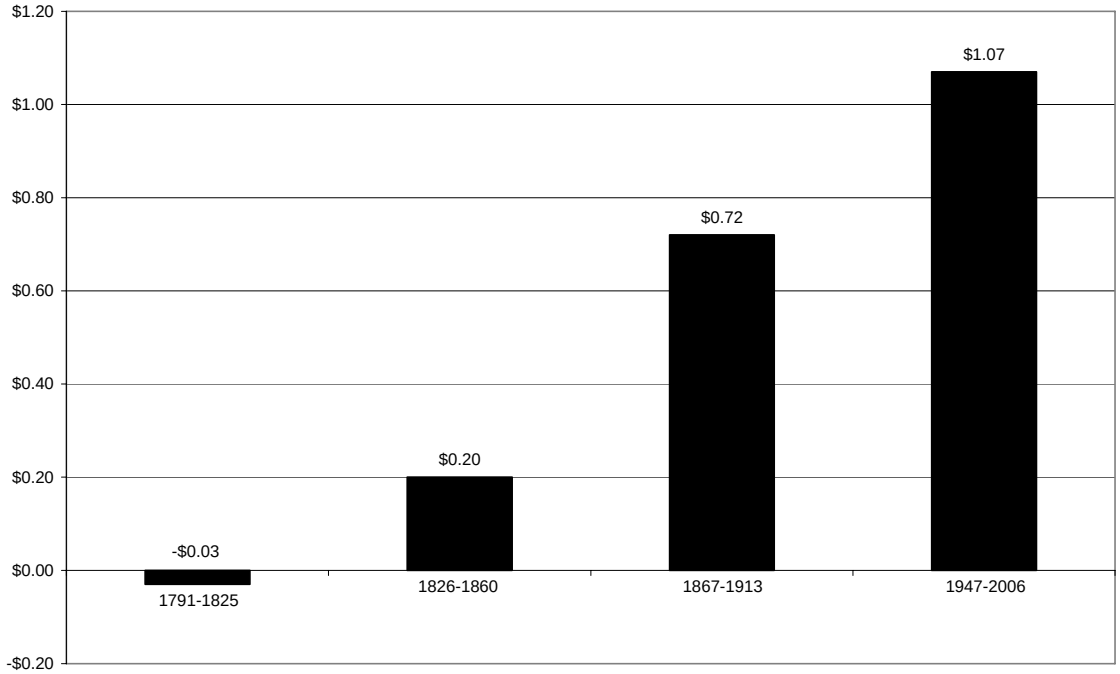
The tax-spend-deficit relationship has changed drastically over time. We used regression techniques similar to those used initially to estimate the relationship between spending and taxation for four fairly lengthy (at least 35 years), predominantly peacetime periods in American history: 1791-1825, 1826-1860, 1867-1913, and 1947-2006. Other control variables, many shown unimportant above, are excluded mainly because of data limitations.

The results are summarized in Graph 1. In the earliest years of the Republic, revenue increases were not associated with spending increases; indeed, spending fell slightly (the type of change envisioned in the 1990 budget agreement). Even as late as 1867 to 1913, tax increases seem to induce some spending increases, but also some deficit reduction (if

spending rises 72 cents per dollar of new taxes, then the other 28 cents of that dollar goes for deficit reduction).

Over time, the federal government's "marginal propensity to consume" has risen consistently. The political benefits of spending are on the rise. Whereas, in an earlier era, shifts in the deficit or tax supply curve raised the possibility that a tax increase could lead to some deficit reduction, this has not been the case since World War II (and was becoming less the case even before then).

Graph 1: Estimated Spending Associated with $1.00 increase in Taxes



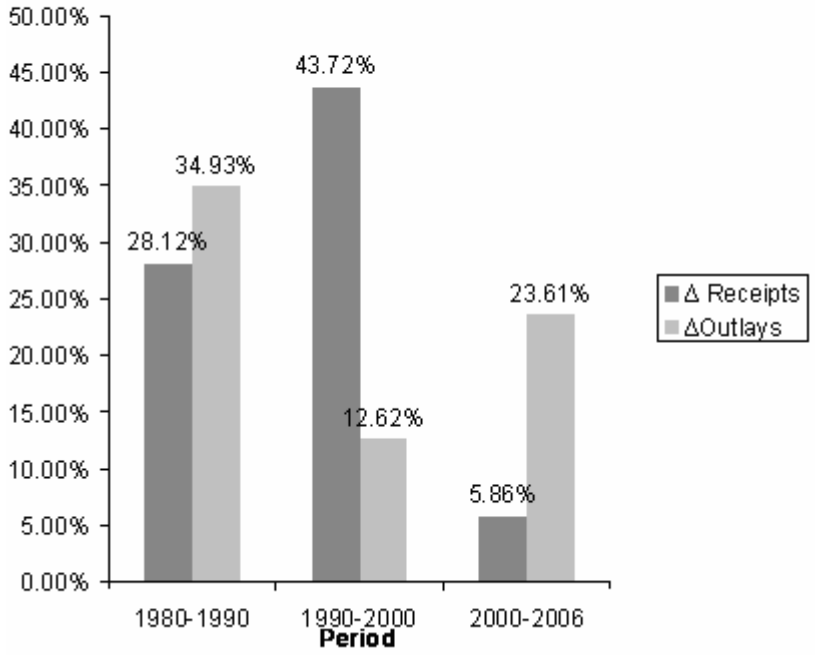
While the above graph demonstrates long run trends, it is also important to consider more recent history. Shifting focus onto the last generation, Table 2 and Graph 2 show the departure from previous tax-spend relationships during the 1990's, as well as their return since 2000. One possible explanation for this aberration could be the end of the Cold War and the subsequent decline in defense spending as a percentage of gross domestic product. With the fall of the Iron Curtain, the threat to America has been greatly diminished, reducing the need for defense spending and facilitating a roughly 40 percent reduction in defense expenditure, from 5.31% of GDP in 1990 to 3.27% in 2000. This exogenous shock in defense spending has masked the more systematic increases that have been discussed throughout this paper, such as the increase in transfer payment from 9.82% percent of GDP to 10.57% over the same period.

TABLE 2:
Historical Context of Deficit Spending (in Billions)

Year	Receipts	Outlays	Deficit
1990	1081.5	1253.5	172
1992	1177.2	1444.6	297.4
1994	1320.8	1533.1	212.3
1996	1524	1665.8	141.8
1998	1773.8	1734.9	-38.9
2000	2053.8	1865.4	-103.6
2002	1853.2	2101.1	247.9
2004	2001	2383	382
2006	2538.2	2691.7	153.5

Note: All values are in billions of current (not inflation adjusted) dollars.

GRAPH 2:
Change in Reciepts and Outlays



IV. Explaining the Results: A Cost-Benefit Approach

Spending and tax changes do not occur by chance out of the blue. Governmental decisionmakers are responsible for changes in taxation, spending and, residually, the federal budget deficit. Although there are many participants in the decisionmaking process, including the President, bureaucrats in the Executive Branch, and possibly even the federal judiciary, the prime decisionmakers are the Members of Congress who must approve the spending and tax plans of the nation.

Dwight Lee and Richard Vedder have devised a model which is expositionally useful in explaining the proximate causes of the observed tax-spending relationship noted above.[14] They assume that politicians, like other citizens, try to maximize their "utility" or satisfaction in life. While utility maximization involves behavior that enhances income and power, a prime consideration to lawmakers is job security. Therefore, a given tax or spending change is evaluated in part on its impact on voters and electoral prospects.

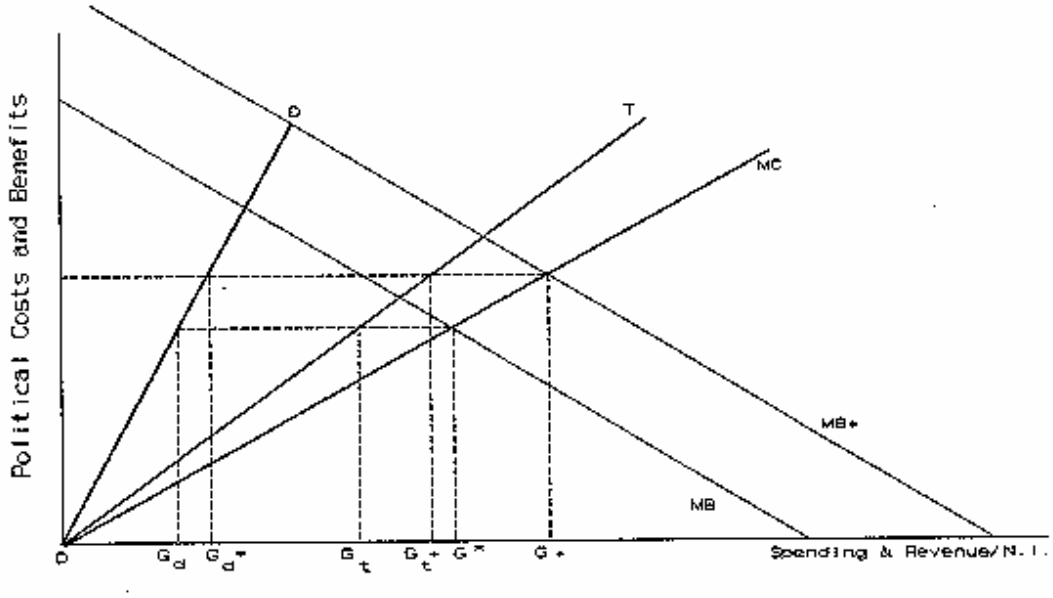
It is assumed that increased federal spending confers what Lee and Vedder term "marginal political benefits" on legislators.[15] While the total benefits increase as spending increases, the extra or marginal benefits from, say, another billion dollars in spending diminishes because of what is often called "the law of diminishing returns" (the first billion dollars in farm subsidies, for example, wins more added votes than the 21st billion dollars in spending).

Added spending must be financed, however, and taxation and borrowing, the two viable alternatives, both impose political costs on lawmakers. The greater the amount of taxation or deficit financing, the greater those marginal political costs become. This is often called the "law of increasing costs" by economists.

The Lee-Vedder model is shown in Graph 2. The MB line represents the marginal political benefits of spending, and can be called the "spending demand curve." The D line represents the marginal political costs of deficit spending, while the T line represents the marginal political costs of taxation. The D line lies above the T line since throughout history politicians have mainly resorted to taxation in federal finance, suggesting the marginal political costs of financing a given level of spending, at least until recent decades, is higher by borrowing than by taxing. The growth of federal spending to new highs, however, suggests that the optimal tax-deficit mix has moved toward borrowing as resistance to ever higher taxation has intensified.

The D and T lines can be added together horizontally to obtain the total marginal political cost of financing government, which is denoted as the MC (marginal cost) curve, but which can be viewed as the "revenue supply curve," just as its components D and T can be viewed as the "deficit supply curve" and the "tax supply curve" respectively. All the variables in Graph 2 are expressed as a percent of national income (or GNP), to abstract from shifts in the curves reflecting simple growth in income or output over time.

Graph 2 -- Political Equilibrium: Taxes, Spending, and Deficits



The intersection of the political demand curve MB and the revenue supply curve determines the equilibrium or stable level of spending, taxation and deficits. As drawn, total spending will be G*, deficits will equal G_d, and taxes will equal G_t. At any other

combination of taxes and deficits equal to G*, politicians can increase their net benefits (utility) by moving to the combination indicated in Graph 2.

Suppose that the marginal political benefits of spending any given proportion of the national income grow over time. The MB curve will move to MB +, equilibrium spending will rise to G +, deficits will grow to G_d +, and taxes will rise to G_t +. In other words, an increase in the marginal political benefits from spending federal funds leads to higher levels of spending, higher levels of taxation, and higher levels of deficits -- exactly the experience of the postwar era.

Thus, if this model approximates reality, the proximate cause of rising levels of spending, taxation and deficits has been the increased political benefits of spending funds. Despite rhetoric about deficit reduction, the propelling factor in fiscal finance has been the growing political gains from spending over time.

By contrast, suppose the D curve had shifted to the left, meaning the marginal political costs of deficit spending had risen. That would lead to a corresponding shift to the left in the MC curve, and a new equilibrium situation where spending and deficits would fall, but taxes would rise. Such results have been observed for short years (e.g. in the 1990s), but have not been sustainable in the long run.

The evidence that defense spending falls with tax increases may seem hard to relate to the theoretical approach here, particularly since other forms of spending tend to rise considerably. This would suggest that the marginal political benefits of spending vary significantly with the type of spending. For many constituencies, higher defense spending represents a cost, not a benefit. It probably serves the rhetoric surrounding tax increases (usually couched in deficit reduction terms) to push for real, tangible defense cuts (which are often politically popular), while giving only lip service to politically unpopular (with some interest groups, at least) transfer payment cuts (which are often even explicitly ruled out of discussion in budget negotiations).

V. The State and Local Governmental Experience, 1947-2006

While the postwar federal experience has been characterized by increases in spending, taxation and deficits, how does that compare with the experience of state and local governments? Has a dollar in new revenue been associated with more than a dollar in new spending (meaning larger budget deficits), or less than a dollar (meaning smaller budget deficits)?

Using the same simple regression procedures as before, and the same control variables for comparison purposes, we regressed state and local spending against state and local revenues for the calendar years 1947-2006.[16] The results are:

$$\begin{aligned} \text{Spending} = {} & -21.71 \;(-1.81) + 0.99\ \text{Taxes}\ (134.49) + 3.69\ \text{Unemployment}\ (1.68) \\ & - 1.29\ \text{Growth}\ (-2.91) + 14.54\ \text{War}\ (2.25) + 68.96\ \text{Inflate}\ (1.1419) \end{aligned}$$

$$\bar{R}^2 = 0.9994 \quad \text{D-W} = 0.7149 \quad \text{F-Statistic} = 18617.04$$

where again numbers in parentheses are t-values.[17]

The results, which are extremely robust statistically, suggest that each $1.00 in new state and local revenues (primarily taxes) was associated with 99 cents in new state and local spending. Unlike with the federal government, spending rose less rapidly than tax revenues, and tax increases slightly improved, rather than worsened, the cash position of government.

Why the difference in results between the federal, state and local governments? While a full discussion of this is beyond the scope of this paper, we would suggest that there are major differences in institutional budgetary constraints.[18] State and local governments, excepting the state of Vermont, are subject to state-balanced budget amendments. While those amendments do not always include all forms of spending (e.g., capital expenditures), they do impose some constitutional constraints on spending. Accordingly, state and local politicians are typically constitutionally mandated to finance new expenditures immediately by spending reductions in other areas or by a tax increase, imposing political costs not generally observed at the federal level. Other tax or spending limitations (e.g., California's Proposition 13) also exist. In addition, in most states governors possess line-item veto power.

The difference in results is significantly striking to suggest that perhaps the federal authorities could learn a lesson from the state and local governmental components of the Union. While other differences may exist, the variation in constitutional frameworks is particularly striking and worthy of study.

VI. Other Perspectives on the Issue

One major potential criticism of the analysis above relates to causality. Demonstrating that taxes and spending are positively related does not "prove" that higher taxes "cause" higher spending. It is possible that higher spending induces higher taxes, rather than the other way around.

The theoretical analysis above, however, suggests that the tax-spend relationship's causality really is best evaluated in terms of the underlying motivations for observed changes. The Lee-Vedder theoretical approach is highly consistent both with traditional macroeconomic approaches to human behavior and the empirical evidence. It suggests that taxes and spending simultaneously increase because of inexorable pressures on politicians to increase spending that arise from the political benefits that spending

confers. The genesis of the pressures seems to come from what Mancur Olson terms "distributional coalitions" who want funds not to enhance governmental services, but to increase incomes or what is termed by economists as "economic rent." If this view is correct, attempts to reduce the budget deficit will be futile until the "rules of the game" change in a manner that alters the political incentive structure, raising the political costs of deficits, lowering the political benefits of spending, lowering the political costs of taxation, or a combination of the three.

With that very major caveat in mind, it is possible by looking at lagged relationships between taxation and spending to draw inferences about causation. Our own limited efforts in this area, not reported here, are far more consistent with the view that tax changes induce spending changes. Others, however, have observed the opposite.[19] There has been even a larger body of evidence, however, in support of the view that taxation causes spending changes rather than the other way around, at least at the federal level.

Manage and Marlow used causality testing of the Granger variety to conclude that taxes promote spending.[20] Rati Ram, investigating the contradictory Manage-Marlow and Anderson-Wallace-Warner findings, concludes that Manage and Marlow are correct at the federal level, namely that revenue changes induce expenditure change.[21] In this regard, Ram also agrees with the econometric evidence presented by Paul Blackley on the American federal experience.[22] Interestingly, recent evidence for Canada supports the hypothesis that causation goes from taxation to expenditures rather than the other way around.[23] A variety of other rigorous studies have investigated this relationship in other countries, with results including bidirectional causality, taxation causing spending, and spending causing taxation.[24]

Concluding, a majority of the evidence supports the "tax and spend" hypothesis over the "spend and tax" one. Yet we wish to remind the reader that if the political benefits from spending are positive and continue to grow over time, often being greater than the political costs associated with financing that spending, the deficit problem cannot and will not be resolved through tax measures.

In additional results, to appear in a subsequent study, we estimate that attempts to decrease deficits by spending reductions have the advantages of accelerating the growth in incomes, output, and employment. Regression analysis suggests federal spending outside a range of about 14 - 17 percent of GDP tends to be growth retarding. This is consistent with previous JEC studies by Vedder and Gallaway, and Gwartney and Lawson. The historical evidence for the post World War II period suggest that attempts to reduce deficits by tax increases typically fail.

VII. Conclusions

Increases in federal tax revenues continue to be associated with greater increases in federal expenditures, leading us to conclude that tax increases do not reduce budget deficits. The evidence suggests that higher tax revenues are associated with massive increases in income redistribution activity of various forms, especially transfer payments.

Indeed, redistributionist activities seem to have crowded out some traditional expenditures of government services, particularly defense.

The cause of the deficit problem does not appear to be inadequate taxes, but rather the political gains from spending, gains that are rising over time, particularly to finance redistributionist activity. Historically, there was a time when tax increases meant deficit reduction, but that time passed in the early part of this century. State and local governments still are able to constrain spending increases to levels equal to or less than the taxes raised. Why? We would tentatively suggest that the answer may lie in different institutional constraints, such as balanced budget amendments, spending limitation amendments, line-item vetoes, etc., measures that lower the marginal political benefits of new spending to political decision makers. In any case, the federal fiscal problem is not likely to be solved without significant behavioral change on the part of those decision makers, and those changes are not likely given the current system of political rewards and costs.

Endnotes

1. Richard Vedder is a Distinguished Professors of Economics at Ohio University and a Visiting Scholar at the American Enterprise Institute. Jonathan Leirer is a graduate student of Economics at Florida State University.

2. "Federal Tax Increases and the Budget Deficit, 1947-1986: Some Empirical Evidence," *Congressional Record*, April 30, 1987, pp. S 5754-5755.

3. Richard Vedder, Lowell Gallaway and Christopher Frenze, *Taxes and Deficits: New Evidence*, study prepared for Senator William Roth and Representative Richard Armey, Joint Economic Committee, United States Congress, October 30, 1991.

4. The basic data were mostly taken from the *2007 Economic Report of the President*, from the Bureau of Economics Analysis, and from the Bureau of Labor Statistics.

5. Testing $1.08 as statistically different from $1.00 yields a t-statistic of 1.90, which is significant at the 95% confident level.

6. We used the growth in real GDP as our measure of growth, and the unemployment rate for civilian workers; found in the Bureau of Economic Analysis and Bureau of Labor Statistics websites, respectively.

7. The variable took the value of one for the years 1950-53, 1965-72, 1991-1992, 2003-2006 and the value of zero for all other years.

8. The annual CPI value for all urban consumers was used in calculating price changes; in the 1987 study, calculations were based on December-to-December price changes.

9. The t-values are heteroskadasticity and auto-correlation corrected using Newey-West HAC Standard Errors & Covariance (lag truncation=3). See Newey, WK. “A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix.” *Econometrica*, v. 55 issue 3, May 1987, p. 703-708.

10. Significance based on a 95% level of confidence.

11. In 1987, Vedder, Gallaway and Frenze reported a $1.58 coefficient on the tax variable. Incorporating some data revisions to some variables, in 1991 Vedder et. al. obtain a coefficient of $1.50 using the 1947-86 period, but reported $1.59 using the 1947-90 period. Here the coefficient is $1.07 using the 1947-2006 period.

12. Testing $1.07 as statistically different from $1.00 yields a t-statistic of 2.30, which is significant at the 95% confident level

13. Vedder, Gallaway and Frenze, *Congressional Record*, p S 5755.

14. Dwight R. Lee and Richard K. Vedder, "Friedman Tax Cuts Vs. Buchanan Deficit Reduction As the Best Way of Constraining Government," *Economic Inquiry*, October 1992, pp. 722-732.

15. This assumption is commonly made by many economists, including some Nobel laureates. See, for example, Milton Friedman and Rose Friedman, *Tyranny of the Status Quo* (San Diego: Harcourt Brace Jovanovich, 1983), and James M. Buchanan and Richard E. Wagner, *Democracy in Deficit: The Political Legacy of Lord Keynes* (New York: Academic Press, 1977).

16. The basic data are found through the Bureau of Economic Analysis and the Bureau of Labor Statistics, as well as the *2007 Economic Report of the President*.

17. The t-values are heteroskadasticity and auto-correlation corrected using Newey-West HAC Standard Errors & Covariance (lag truncation=3). See footnote 9 for further reference.

18. Rati Ram has observed interesting international differences in the tax and spend relationship. See his, "A Multicountry Perspective on Causality Between Government Revenue and Government Expenditure," *Public Finance*, 1988, No. 2, pp. 261-270.

19. George von Furstenberg, Jeffrey Green, and Jin-Ho Jeong, "Tax and Spend, or Spend and Tax?" Review of Economics and Statistics, May 1986, pp. 179-188, and William Anderson, Myles Wallace and John Warner, "Government Spending and Taxation: What Causes What?" *Southern Economic Journal*, January 1986, pp. 630-639.

20. Manage, Neela and Michael L. Marlow, "The Causal Relation Between Federal Expenditures and Receipts," *Southern Economic Journal*, January 1986, pp. 616-629.

21. Ram, R., "Additional Evidence on Causality Between Government Revenue and Government Expenditure," *Southern Economic Journal*, January 1988, pp. 763-769.

22. Blackley, Paul R., "Causality Between Revenues and Expenditures and the Size of the Federal Budget," *Public Finance Quarterly*, April 1986, 139-156.

23. Ahiakpor, James C.W. and Saleh Amirkhalkhali "On the Difficulty of Eliminating deficits with Higher Taxes: Some Canadian Evidence," *Southern Economic Journal*, July 1989, pp. 24-31.

24. Narayan, Paresh Kumar, and Narayan, Seema, "Government Revenue and Government Expenditure Nexus: Evidence from Developing Countries," *Applied Economics*, February 2006, pp. 285-91, Islam, Muhammad Q., "Structural Break, Unit Root, and the Causality between Government Expenditures and Revenues," *Applied Economics Letters*, August 2001, pp. 565-67, Hatemi-J, A, and Shukur, G. "The Causal Nexus of Government Spending and Revenue in Finland: a Bootstrap Approach." *Applied Economics Letters*, October 1999, p. 641-644, and Owoye, O., "The Causal Relationship between Taxes and Expenditures in the G7 Countries: Cointegration and Error-correction Models." *Applied Economics Letters*, January 1995, p. 19 - 22.