U.S. Economic Growth: Rahn Curve and Components of Government Spending

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The controversial Rahn Curve is the relation of government spending with economic growth. It is argued that government spending is inefficient and should therefore be negatively related or uncorrelated with the growth of Gross Domestic Product (GDP). Whether there is a Rahn Curve is an empirical question which has been examined with mixed results for the U.S. economy. There has been little effort to disaggregate federal expenditures to see if there are components which are highly correlated with economic growth. However, some components of government spending which are theoretically related to economic growth, e.g., social security, funding of research grants, infrastructure building, and education. On the other hand, other expenditures such as debt service, police protection, even military spending does much to aid GDP growth. This paper uses components of federal expenditures as the explanatory variable for GDP growth.

INTRODUCTION

The decade of the 1930s was one of economic upheaval. The Great Depression resulted in Franklin Roosevelt being elected President, and his "New Deal" legislation has been credited with mitigating the effects of the Depression (LeKachman, 1966). Albeit, there has been revisionist history that argues that the fiscal stimulus of New Deal was not entirely responsible for the country's emergence from the Great Depression (Barro, 1979). Clearly, the role of government and its impact on economic growth and stability remains somewhat controversial to this day.

The classical school of economic thought suggested that depressions would be corrected by flexible wages and the free operation of markets; a contention that appeared at odds with the state of affairs in the early 1930s (Heilbroner, 1972). Breaking with the classical view, John Maynard Keynes began a revolution, of sorts, in economic policy with the publication of his *General Theory of Money, Interest and*

Prices (1936). One of the many results of the publication of this book was to change the majority of economists' views of fiscal policy and the role of government in stabilizing the economy. Doubts about the self-correcting mechanism in an economy, the assumption of flexible wages in free markets, especially in the downward direction, gave way to a more activist role for the government through fiscal policy to stabilize business cycles. This view was strengthened by the fact that as the 1930s closed the U.S. economy seemed poised for prosperity. Over the decades since the Great Depression and New Deal legislation the classical school has regained its balance and has argued that government may be the problem not the solution in unstable economic growth. In a recent paper, the arguments have been summarized (Chobanov and Mlandenova, 2008):

> Many see government as an agent striving to correct the inadequacies and excesses of the unrestrained markets. The government provides the public goods the market is incapable of providing and removes distortions in the allocation of resources due to externalities. Others view politicians, public sector employees, and special interest groups as seeking to use the power of government for their own purposes. Distortions arising from political decision making can outweigh the benefits from government activities, thus reducing social welfare. When this occurs government is no longer a solution but is a problem. It is probable that both hypotheses are right in different circumstances.

In any event, there have been a significant number of empirical studies published in the literature concerning the relation of government spending (and taxation) with economic growth. However, to date, there is little consensus among economists concerning the nature of this relation.

Empirical results for the G-7 countries for the period 1885-1987 indicate that the relationship between government spending and economic growth varies significantly across countries and overtime; exhibiting both negative and positive statistical associations (Hsieh and Lai, 1994). Again, results reported by Rati Ram (1986) shows that there is evidence of both a positive relation between government spending and economic growth, particularly for low- income countries and some negative relations elsewhere. Several studies have been published that report a negative relation between government spending and economic growth when government spending is financed by debt. (Carlston and Gokhale,, 1991). Also reporting a negative relation was a study of socialist countries in which non-democratic processes result in spending on such things as the military and police (Guseh, 2007). In addition, there are results which show that there is no statistically significant relation between government spending and economic growth (Barro, 1989). The evidence from existing studies also suggests that for a Rahn Curve relationship to exist, the size of public sector spending must be "significant." That is, total government spending would range upwards of 17% of GDP (e.g., Rahn and Fox, 1996; Chobanov and Mladenova, 2009, pp. 8-10).

It is readily apparent from a cursory review of the literature that there are significant differences in the findings scholars examining this relation. These differences exist over time and across countries. There is also some evidence to suggest that there are differences in the *types* of government expenditure in evidence over time and across countries. These results suggest that it may be useful to examine time-series data for the United States using major expenditure categories.

The purpose of this paper is to examine major components of Federal expenditures to determine if there are statistical anomalies associated with economic growth in the United States. It is hypothesized that there are differences in the relation of defense and nondefense Federal expenditures and the economic growth rate in the United State. The period examined is for the period from the first quarter of 2000 through the fourth quarter of 2015 (a total of 64 quarters). Upon completing the statistical analysis, conclusions will be drawn concerning what the evidence suggests about the relation between government spending and economic growth and whether these results have implications for economic policy.

TABLE 1
GROWTH OF U.S. GDP AND FEDERAL SPENDING (BILLIONS OF U.S. DOLLARS)

	1st Quarter 2000	4th Quarter 2015	Percent Change
G.D.P.	10,031.0	16,470.6	64.2
Federal Defense	380.7	683.1	79.4
Federal Non-Defense	237.4	433.2	82.5

Source: Bureau of Economic Analysis

Table 1 presents the data for beginning and ending quarters of the period examined. From 2000 to 2015 GDP grew 64% over the period (chained dollars). Federal defense spending grew 79.4% over the same period (from just under 3.8% of GDP to just over 4.1% of GDP). Federal non-defense spending also grew over the period by 82.5%. At the beginning of the period non-defense Federal spending was just under 2.4% of GDP, and by the end of the period it was just over 2.6%. Defense spending has been, and continues to be largest component of federal expenditures accounting for more than 61% of federal expenditures, slightly more than at the beginning of the period (less than .5%).

A significant proportion of this spending was financed by the federal government going to the debt markets. By the end of the period the U.S. debt was almost $19 trillion, much of which was owed to the U.S. government (Federal Reserve, Social Security Administration, etc.) Debt maintenance is not included in these spending statistics. Of this debt, over $5 trillion is held in government accounts, and over $13 trillion is publically held, almost all of which is in the form of Treasury Bills, Notes or Bonds, and the majority of that is held domestically (Bureau of Fiscal Service, U.S. Department of the Treasury, March, 2016). The debt maintenance of federal indebtedness for 2015 was $28 billion less than it was for 2014 at a total $402.4 billion; or roughly the same as the amount spent on non-defense expenditures of the U.S. government. (Treasury Direct, March 2016). Therefore, the debt maintenance accounts are not considered in this analysis as it is less than 2.25% of GDP.

It is interesting to note that State and Local government expenditures in the United States were $1177 billion (nearly double that of the Federal Government's spending) and had grown to $1750 billion by the end of the period (a percent change of 48.7% over the period). While growing more slowly that the Federal budget, it is still far larger totaling just under ten percent of GDP.

Federal expenditures, including defense, non-defense, and debt maintenance amounts to nearly 7% of GDP. If we add State and Local government to the Federal expenditures the total still falls short of 17% of GDP. In view of previous studies, it is therefore hypothesized that neither category of Federal expenditure Granger causes GDP (either negative or positive influence). Because the determination of the amount the Federal Government spends is unrelated to either the tax base or rate, and is determined politically it is also hypothesized that GDP does not Grange cause either category of Federal expenditure.

RESULTS

Table 2 reports the results for the Granger Causality tests applied to the period 2000-2015 in the United States.

TABLE 2
GRANGER CAUSALITY (WALD) TESTS

Variable (Non-Defense)	GDP Growth Rate $\chi 2$ Statistic (p value)	Government Expenditure $\chi 2$ Statistic (p value)
GDP Growth Rate Non-Defense Expenditure 2 degrees of freedom	0.916 (0.633)	0.076 (0.963)
(Defense) GDP Growth Rate Defense Expenditures 2 degrees of freedom	3.377 (0.185)	2.619 (0.270)

* We could not reject the hypothesis of a unit root for any of the three series of data at the 5 percent significance level, using the augmented Dickey-Fuller test.

As hypothesized, the chi-square tests for the Granger Causal relation are not statistically significant for any of the hypothesized relations. There is no evidence for the period that either category of Federal expenditures Granger caused GDP. Conversely, the evidence also allowed us to reject the hypothesis that GDP Granger caused Federal expenditures. All politics aside, the relative size of current Federal government expenditures with respect to GDP leaves little theoretical or practical basis upon which to conclude that there should be a causal relation between individual categories of Federal expenditures and GDP, and vice versa. The research reported to date, is consistent with these findings and it should come as no great surprise that for 2000-2015, with Federal current expenditures short of 5%, that there would be no evidence of a causal relation.

CONCLUSIONS

The evidence reported here for the period 2000-2015 is consistent with previous research findings that where government expenditures are less than 17% of GDP that there is likely no causal relation to be observed between GDP and government expenditures. Government expenditures are determined politically, not by some theoretical relation with GDP, therefore the lack of evidence of Granger causality running from GDP to expenditures is expected. The relatively small size of the Federal government relatively to GDP is also a strong hint that there will be no evidence of a Granger causality running from expenditure to GDP. The historical record and evidence from countries with larger public sectors than the U.S. are not predictive in this period.

The policy conclusions are straightforward. Your children's future are not dependent on current levels of federal spending. The results of this study suggest that those arguments are merely fear tactics used by some politicians which may have agenda which are ideologically motivated, and not based in sound economic evidence.

REFERENCES

Barro, R. (1989). A Cross-Section Study of Growth, Savings and Government. *NBER Working Paper, No, 2855.*

Barro, R. (1979) Second Thoughts on Keynesian Economics, *American Economic Review,* Vol. 69, pp. 52-65.

Carlstrom, C. And J. Gokhale (1991). Government Consumption, Taxation and Economic Activity, *Federal Reserve Bank of Cleveland Economic Review, 3rd Quarter.* Pp. 18-29.

Chobanov, Dimitar and Adriana Mladenova, (2009). *What is the Optimum Size of Government?* Sophia, Bulgaria: Institute for Market Economies.

Bureau of Fiscal Service, U.S. Department of the Treasury, March, 2016; Table FD1-FD-7.
Guseh, J. (2007). Government Size and Economic Growth in Developing Countries: A Political-Economy Framework, *Journal of Macroeconomics.* Vol. 19, no. 1, pp. 175-192.
Heilbroner, Robert (1972) *The Worldly Philosophers, fourth edition.* New York: Simon and Schuster.
Hsieh, E. And K. Lai (1994). Government Spending and Economic Growth: the G-7 Experience, *Applied Economics*, vol.26, no. 5, pp. 679-92.
Keynes, John Maynard (1936), *General Theory of Money, Interest and Prices.* London: Palgrave Macmillian Publishing Company.
LeKachman, Robert, (1966), *The Age of Keynes,* New York: Random House.
Rahn, R. And H. Fox (1996). What is the Optimum Size of Government, *Vernon K. Krieble Foundation.*
Ram, Rati, (1986) Government Size and Economic Growth: A New Framework and Some Evidence from Cross-section and Time-series Data. *The American Economic Review.* Vol. 76, pp. 191-203.
U.S. Department of the Treasury, *Treasury Direct*, Interest Expense on the Debt Outstanding, March 2016.