St. John Fisher College

Fisher Digital Publications

Economics Faculty/Staff Publications

Economics

Fall 2005

A Note on Government Budgets

Ben L. Kyer
Francis Marion University, byker@fmarion.edu

Gary E. Maggs
St. John Fisher College, gmaggs@sjfc.edu

Follow this and additional works at: https://fisherpub.sjfc.edu/economics_facpub

Part of the Economics Commons

How has open access to Fisher Digital Publications benefited you?

A Note on Government Budgets

Abstract

The standard pedagogical examination of government budgets includes the distinction between cyclical and structural deficits and surpluses and changes thereof. This paper extends the regular classroom analysis and graphically demonstrates that cyclical changes in the government budget can be decomposed and stated as the summation of the expenditure effect and the revenue effect.

Disciplines

Economics

Comments

A NOTE ON GOVERNMENT BUDGETS

by Ben L. Kyer* and Gary E. Maggs**

Abstract

The standard pedagogical examination of government budgets includes the distinction between cyclical and structural deficits and surpluses and changes thereof. This paper extends the regular classroom analysis and graphically demonstrates that cyclical changes in the government budget can be decomposed and stated as the summation of the expenditure effect and the revenue effect.

Introduction

The analysis of government budgets has become quite common in economics classrooms. Indeed, examinations of the Federal government budget in particular are found in textbooks for principles, intermediate macroeconomics, and public finance courses.[1] As part of this discussion the distinction between cyclical and structural budgets and changes thereof is regularly made in order to differentiate between automatic stabilization and fiscal policy.

A re-examination of the standard pedagogical analysis suggests that it may be modestly extended. More specifically, it appears that cyclical changes in the government budget may be separated into a "revenue effect" and an "expenditure effect". While this distinction is implicit in typical textbook approaches and has been used for empirical measurement,[2] to our knowledge it has not been demonstrated graphically or used pedagogically. The purpose of this paper then is to demonstrate, with a graphical analysis appropriate for various undergraduate students, that cyclical changes in the government budget can be decomposed and stated as the sum of the expenditure and revenue effects. We also introduce definitions of these terms and propose the concept of the cyclical effect.

The Analysis

Our analysis is achieved with Figure 1 which shows the two components of the Federal government budget. Given the progressivity of the personal income and corporate profits taxes and the proportionality of the payroll tax, total tax revenue R is shown as a positive function of real income Q. For convenience R emanates from the origin. Total government expenditure S, which is comprised of both government purchases of goods and services and transfer payments, is depicted as a negative function of real income since transfer payments such as unemployment benefits, Medicaid, Temporary Assistance for Needy Families, and grants in aid to state and local governments increase when real gross domestic product decreases.[3] To begin, suppose for simplicity that the economy has achieved the full-employment level of real income Q^{FE} such that both tax revenue and government expenditure are equal to $Q^{FE}A$, the government budget is balanced and the structural and cyclical deficits are zero. Now assume that real income decreases to Q_1.

At Q_1, the cyclical budget deficit (and the actual deficit) has increased and is now equal to the vertical distance BD. This deficit occurs, of course, because of decreased tax revenue and increased government spending and these two distinct effects on the government budget may be graphically identified and measured. First, as real income decreases from Q^{FE} to Q_1, tax revenue decreases to Q_1B. If government spending is theoretically held constant,

*The Benjamin Wall Ingram, III, Professor of Economics, Francis Marion University, Florence, South Carolina, BKyer@FMarion.Edu

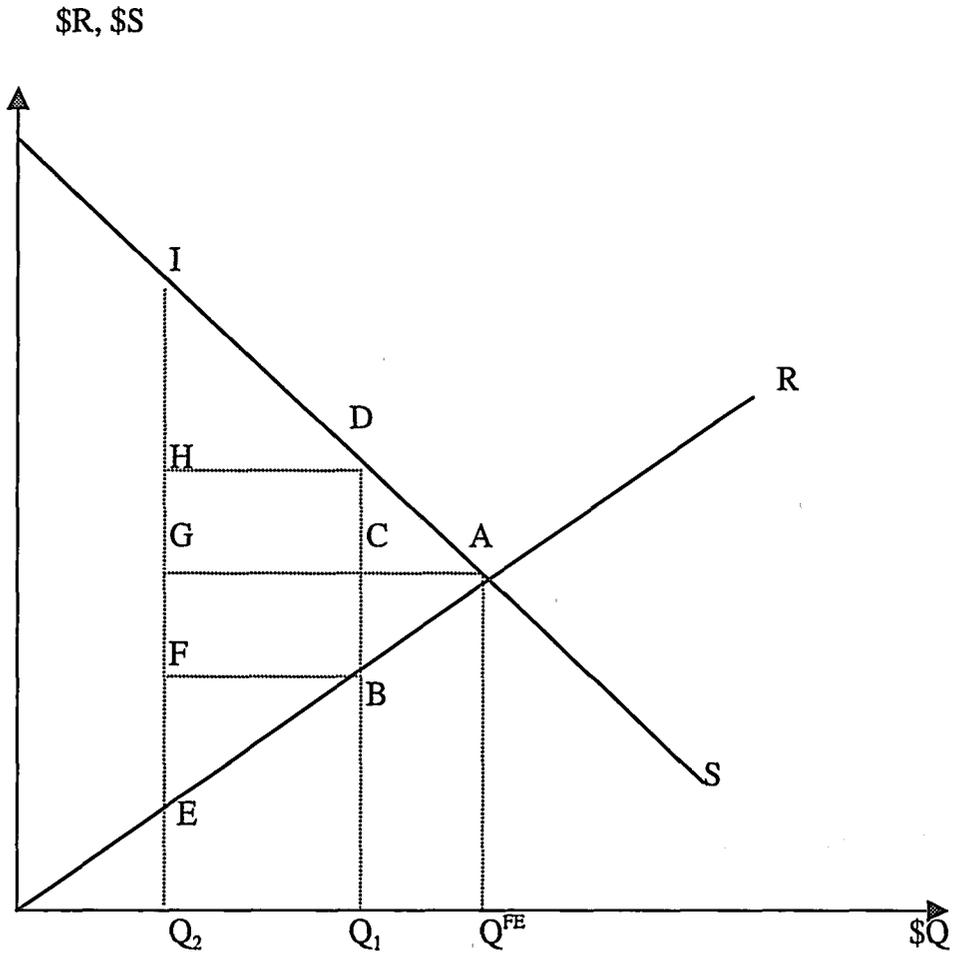**Professor of Economics, St. John Fisher College, Rochester, New York, Maggs@SJFC.Edu

FIGURE 1. Expenditure And Revenue Effects Of The Government Budget

with the construction of line segment AC, the decrease in tax revenue increases the deficit by the amount BC. We call this impact on the government budget the revenue effect and define it as the change in the government's budget position which is caused by a real income-induced change in tax revenue, ceteris paribus. This definition implies that the revenue effect is limited to movements along a given revenue function for a change in real income. Shifts and rotations of the R line are indicative of fiscal policy changes.

Similarly, as real income decreases from Q^{FE} to Q_1, government spending increases to Q_1D. If tax revenue is now artificially held constant, referring again to line AC, the increase in government spending increases the government deficit by the vertical distance CD, which we refer to as the expenditure effect and define as the change in the government's budget position which results only from a real

income-induced change in government spending. As before, the definition infers that the expenditure effect is limited to movements along a government spending function for a change in real income. Fiscal policy would again be demonstrated as a shift or rotation of the expenditure function.

We now propose that the total change in the government's budget position for changes in real income, or the cyclical effect, is equal to the summation of the revenue and expenditure effects, or

Cyclical Effect = Revenue Effect +

Expenditure Effect. (1)

In Figure 1 then, it follows that

$$BD = BC + CD \qquad (2)$$

Suppose now that Q decreases further from Q_1 to Q_2. Using the framework of analysis above, students may be asked to show that the revenue effect

increases the cyclical deficit, which now equals EI, by the amount EF and the expenditure effect increases the deficit by the vertical distance HI.

An advantage of our approach, we believe, is its flexibility in demonstrating various conclusions regarding the shapes of the revenue and expenditure functions. For example, our definitions and graphical measurements make explicit to students that the revenue effect is larger the higher the tax rate, the greater the income elasticity of tax revenue, and the steeper the tax revenue line passing through point A in Figure 1. Additionally, our analysis makes clear that the expenditure effect is smaller the lower the income elasticity of government spending and the flatter the expenditure function in Figure 1. In the extreme, when government spending is independent of real income and the expenditure function is horizontal,[4] the expenditure effect is zero.

Conclusion

An important component of many different economics texts is the discussion of the Federal government budget. This analysis routinely shows that the actual budget position, deficit or surplus, and changes in the budget may be separated into cyclical and structural components and this distinction is made to show the difference between fiscal policy and automatic stabilization. This paper extends the standard analysis and shows that the cyclical component of budget changes can itself be graphically separated into distinct impacts, the revenue and expenditure effects.

Notes

1. For examples of these texts see McConnell and Brue (2005), Gordon (2003), and Hyman, (2005), respectively.
2. See, for example, Holloway and Wakefield (1985).
3. The assumption that transfer payments vary negatively with real income is both rather standard in economic theory and supported by data. As these expenditures rise with lower real gross domestic product, so also will total government spending, ceteris paribus.
4. This is the standard assumption of most textbooks.

References

Gordon, Robert J. *Macroeconomics*, 2003, 9th Edition, Addison-Wesley.

Holloway, Thomas M. and Joseph C. Wakefield, 1985, "Sources of Change in the Federal Government Deficit", *Survey of Current Business*, May , pages 25–32.

Hyman, David N. *Public Finance. 2005 A Contemporary Application of Theory and Policy*, 8th Edition, Thomson-Southwestern.

McConnell, Campbell R. and Stanley L. Brue, 2005, *Economics: Principles, Problems, and Policies*, 16th Edition, McGraw-Hill Irwin.