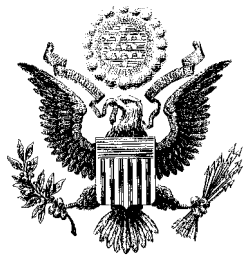
# FEDERAL BORROWING AND INTEREST RATES

## A JOINT ECONOMIC COMMITTEE STUDY




## Vice Chairman Jim Saxton (R-NJ)

**Joint Economic Committee**
**United States Congress**


**December 2003**


**Abstract**

Do federal budget deficits and the resulting accumulation of federal debt affect real interest rates? Economists have not generally found a statistically significant relationship between past or current federal borrowing and current real interest rates. Economic studies using proxies for public expectations about future federal borrowing have produced mixed findings. On balance, the findings of statistical research suggest that any relationship between federal borrowing and current real interest rates, if it does indeed exist, is quite small (measured in tenths of a percentage point).



Joint Economic Committee
1537 Longworth House Office Building
Washington, DC 20515
Phone: 202-226-3234
Fax: 202-226-3950

Internet Address:
http://www.house.gov/jec/

# FEDERAL BORROWING AND INTEREST RATES

## I. INTRODUCTION

This study addresses whether federal borrowing (*i.e*., federal budget surpluses or deficits and the resulting change in the level of publicly held federal debt) significantly affects interest rates in "real" terms (*i.e*., adjusted for inflation or deflation). Economic theory holds that federal borrowing should increase current real interest rates, all other things being equal. However, the business cycle and the Federal Reserve's associated monetary policy actions have large effects on real interest rates, making other things not equal. Economists have encountered statistical difficulties in separating the effect of the business cycle and monetary policy on real interest rates from the effect of the federal borrowing on real interest rates. Consequently, empirical studies have not generally found a consistent, statistically significant relationship between past or current federal borrowing and current real interest rates.[1]

Unable to find this expected relationship, economists have attempted to measure the effect of public expectations for future federal borrowing on real interest rates. These "public expectations" studies have produced mixed findings. On one hand, published studies using their own projections as proxies for public expectations about future federal borrowing have generally failed to find any statistically significant relationship between public expectations about future federal borrowing and real interest rates. On the other hand, a small number of published studies using projections from government agencies or private forecasters as proxies for public expectations about future federal borrowing have generally shown some relationship with current or expected future real interest rates, but the size and duration of this effect varies. On balance, the findings of empirical studies suggest that any statistical relationship between past, current, or public expectations about future federal borrowing and current real interest rates, if it does indeed exist, must be quite small (measured in tenths of a percentage point).

## II. ECONOMIC THEORY

All other things being equal, an increase government debt will reduce the supply of funds available to other domestic borrowers, driving real interest rates up. This is the **crowding out theory**. In an open economy, however, increasing real interest rates will attract an inflow of funds from abroad that will at least partially offset these crowding out effects. Given reasonable estimates of economic variables, the President's Council of Economic Advisers (2003) hypothesized that a $200 billion increase in federal debt should boost real long-term interest rates by three basis points (0.03 percentage points).[2]

The alternative to this crowding out theory is **Ricardian equivalence theory**. Reviving the ideas of the 19th century economist David Ricardo, Robert Barro (1974) hypothesized that individuals do not believe that increases in the size of their holdings of government bonds due to

---

[1] Generally, economists consider as "statistically significant" a value or measure that is significantly smaller or larger than would be expected by chance alone.

[2] Executive Office of the President, Council of Economic Advisers, *Economic Report of the President together with the Annual Report of the Council of Economic Advisors* (Washington, D.C.: Government Printing Office, February 2003): 57-58.

budget deficits are increases in their real wealth under most circumstances.[3] Instead, individuals anticipate that increases in the level of government debt now will require tax increases in the future. Consequently, individuals decrease their consumption and increase their savings now to pay such anticipated taxes in the future. The additional savings from individuals exactly offset the additional debt issued by government. Therefore, according to Barro, changes in the relative amounts of debt and tax financing for a given amount of government spending should have no effect on aggregate demand, real interest rates, and capital formation.[4]

## III. PREVIOUS EMPIRICAL STUDIES

During the last quarter century, economists have conducted numerous empirical studies to judge the validity of these competing theories. While a comprehensive analysis of these studies is beyond the scope of this JEC paper, a summary of the primary findings follows.

Empirical studies have generally failed to find a consistent, statistically significant relationship between past or current federal borrowing and current real interest rates. Flummoxed, economists have then tested whether public expectations about future federal borrowing have affected real interest rates either currently or in the near future. These empirical studies have produced mixed results. Published studies using their own projections as proxies for public expectations about future federal borrowing based on past economic results have generally failed to find a consistent, statistically significant relationship between such estimates and current nominal or real interest rates. A small number of published studies using projections from government agencies or private forecasters as proxies for public expectations about future federal borrowing have generally found some relationship between such projections and current nominal or real interest rates.

Among these studies are:

- Willem Thorbecke (1993) examined the effect of new Congressional Budget Office (CBO) or Office of Management and Budget (OMB) forecasts of the one-year federal budget deficit on the nominal yields of 3-month, 5-year, and 10-year Treasury securities. Thorbecke found that a $100 billion increase in the federal budget deficit caused nominal interest rates to rise on average by 29 basis points (0.29 percentage points) for CBO announcements and by 16 basis points (0.16 percentage points) for OMB announcements between 1980 and 1989.[5]
- Michael Quigley and Susan Porter-Hudak (1994) examined the effect of the appearance in the *Wall Street Journal* of a new forecast of the one-year federal budget deficit on the nominal yield of 3-month Treasury bills between 1979 and 1989. Quigley and Porter-Hudak found that (1) the market responded to a deficit announcement about 40 percent of the time, (2) when it responded, interest rates

[3] Developing countries that lack deep and liquid markets for private debt and equity issues may increase private wealth and stimulate private consumption and investment by issuing government debt. Government debt that is properly serviced becomes a source of liquidity that individuals and firms can use as collateral to finance private investment in illiquid capital assets.

[4] Robert J. Barro, "Are Government Bonds Net Worth?" *Journal of Political Economy* 83 (November-December 1974): 1095-1117.

[5] Willem Thorbecke, "Why Deficit News Affects Interest Rates," *Journal of Policy Modeling* 15 (1993): 1-11.

were affected only temporarily, and (3) the change usually lasted between one and six days. On average, a 1 percent increase in the federal budget deficit implied a 0.37 basis point (0.0037 percentage point) temporary increase in nominal interest rates.[6]

- John Kitchen (1996) examined the effect of new OMB forecasts of federal budget deficits for one-year and multiple years expressed as a percentage of GDP on the nominal yields of 3-month, 6-month, 1-year, 5-year, 10-year, and 30-year Treasury securities from March 10, 1981, through July 12, 1994. Kitchen found that a one-percentage point increase in the projected deficit for one year (expressed as percentage of GDP) increased real interest rates by three to five basis points (0.03 to 0.05 percentage points). Changes in one-year forecasts had a larger impact on short-term interest rates, while changes in multiyear forecasts had a larger impact on long-term interest rates.[7]
- Mathew Canzoneri, Robert Cumby, and Behzad Diba (2002) examined how changes in the CBO's semi-annual forecast of the average federal budget deficit expressed as a percentage of GDP over the next five and ten years affect the interest rate spread between the yield on 3-month Treasury bills and the yields on 5-year and 10-year Treasury notes.[8] Canzoneri, Cumby, and Diba found that an increase of 1 percentage point of GDP in the average federal budget deficit would increase the interest rate spread by between 41 basis points (0.41 percentage points) and 60 basis points (0.60 percentage points).[9]

These studies found a statistically significant relationship between proxies for public expectations about future federal borrowing and nominal or real interest rates. However, the size of this relationship ranged from negligible to modest.

Statistical limitations with the data cause these findings to vary. The business cycle and the Federal Reserve's associated monetary policy actions greatly affect current real interest rates. It is statistically difficult separate these effects from the effect that public expectations about future federal borrowing have may on current real interest rate. Recessions generally lower the private demand for loanable funds and may induce the Federal Reserve to adopt a loose monetary policy to stimulate a recovery. This combination may reduce real interest rates even though the federal budget deficit may be rising and federal debt may be rapidly accumulating. Likewise, an economic boom hikes the private demand for loanable funds and may induce the Federal Reserve to adopt a tight monetary policy. Consequently, real interest rates may rise even though the federal budget may move into surplus and the level of federal debt may diminish.

---

[6] Michael Regan Quigley and Susan Porter-Hudak, "A New Empirical Approach in Analyzing the Effect of Deficit Announcements on Interest Rates," *Journal of Money, Credit, and Banking* 26 (November 1994): 894-902.

[7] John Kitchen, "Domestic and International Financial Market Responses to Federal Deficit Announcements," *Journal of International Money and Finance* 15 (1996): 239-254.

[8] Sample period for five-year CBO forecasts is 1984 through early 2002. Sample period for 10-year CBO forecasts is 1992 through early 2002.

[9] Mathew B. Canzoneri, Robert E. Cumby, and Behzad Diba, "Should the European Central Bank and the Federal Reserve be Concerned about Fiscal Policy?" in *Rethinking Stabilization Policy* (Kansas City: Federal Reserve Bank of Kansas City, 2002): 333-382.

Thus, the effects of these cyclical factors is likely to overwhelm and obscure any effect of public expectations about future federal borrowing on real interest rates.

## IV. TWO RECENT EMPIRICAL STUDIES

In an attempt to eliminate near-term distortions from the business cycle and the Federal Reserve's associated monetary policy actions, Thomas Laubach (2003) used data arising from projections for economic variables five years in the future.[10] As a proxy for public expectations about future federal budget balances and levels of federal debt, Laubach used either CBO or OMB projections of the federal budget balance and the level of federal debt expressed as a percent of GDP five years in the future.[11] As a proxy for expected long-term interest rates, Laubach used the yield expected to prevail on 10-year Treasury notes five years in the future.[12]

Using CBO projections, Laubach found that a one-point increase in the projected federal budget deficit (decrease in the projected federal budget surplus) as a percentage of GDP five years in the future would increase projected real long-term interest rates by 28 basis points (0.28 percentage points) five years in the future. Laubach found that a one-point increase in projected level of federal debt as a percentage of GDP five years in the future would increase projected real long-term interest rates by 5.2 basis points (0.052 percentage points) five years in the future.

Laubach's findings do not necessarily mean that public expectations about future federal borrowing have a statistically significant effect on current real interest rates. To infer such a relationship from these findings, one must assume that CBO or OMB projections of future federal budget deficits and levels of federal debt are unbiased (*i.e.*, without any assumptions or other systemic errors that would cause their projections of future federal budget deficits or the levels of federal debt outcomes to be higher or lower than the best projections). However, both CBO and OMB do make assumptions that may bias their projections.[13] One must also assume that the interest rate futures market correctly estimates any effect that federal borrowing may have on interest rates.

Moreover, Kevin Hassett (2003) questioned whether Laubach had properly separated the effects of cyclical factors on projected real interest rates from the effect of public expectations

---

[10] Thomas Laubach, "New Evidence on the Interest Rate Effects of Budget Deficits and Debt," Board of Governors of the Federal Reserve System Finance and Economics Discussion Series (FEDS) paper (March 2003), found at http://www.federalreserve.gov/pubs/feds/2003/200312/200312pap.pdf.

[11] By employing projections of economic data five years into the future, Laubach took advantage the "long-term mean reversion" characteristic of macroeconomic models; *i.e.*, macroeconomic models smooth the near-term ups and down in economic variables as projections stretch into the future. Claiming that his model dampens cyclical fluctuations, Laubach asserts that his model is more informative about long-term federal budget policy and a better approximation of public expectations for eventual level of federal debt relative to GDP than past, current, or near-term projections of federal budget balances or levels of federal debt.

[12] Laubach calculated this yield from a simple average of one-year forward rates for five to fourteen years, using the yield curve of zero-coupon Treasury bonds.

[13] CBO and OMB make certain assumptions when making projections. For example, CBO generally assumes that Congress will maintain current law regarding federal spending and taxes, while OMB generally assumes that Congress will enact the President's policies regarding federal spending and taxes. Neither assumption may be "the best estimate" about future federal spending and taxes. Therefore, CBO and OMB projections may not necessarily be unbiased proxies for public expectations about future federal borrowing.

for future federal borrowing on projected real interest rates.[14] Specifically, Hassett added an unemployment rate variable as a proxy for the effect of cyclical factors to Laubach's model and ran Laubach's data through this modified model.[15] Hassett found:

- The relationship between the projected level of federal debt five years in the future and projected real interest rates five years in the future became statistically insignificant.
- The relationship between projected federal budget deficit five years in the future and projected real interest rates five years in the future remained statistically significant, but the size of this relationship dropped by about two-fifths. Using CBO projections, Hassett found the size of this relationship between a one-point increase in the projected federal budget deficit as a percentage of GDP five years in the future and the projected increase in the real interest rate on 10-year Treasury notes five years in the future fell from 28 basis points (0.28 percentage points) to 17 basis points (0.17 percentage points).[16]

Given these findings and the findings of the literature reviewed in section 3 of this study, the empirical determination of the size of any statistical relationship between current real interest rates and public expectations for future federal borrowing remains statistically debatable. On balance, the findings of empirical studies suggest that any statistical relationship between past, current, or public expectations about future federal borrowing and current real interest rates, if it does indeed exist, is quite small.

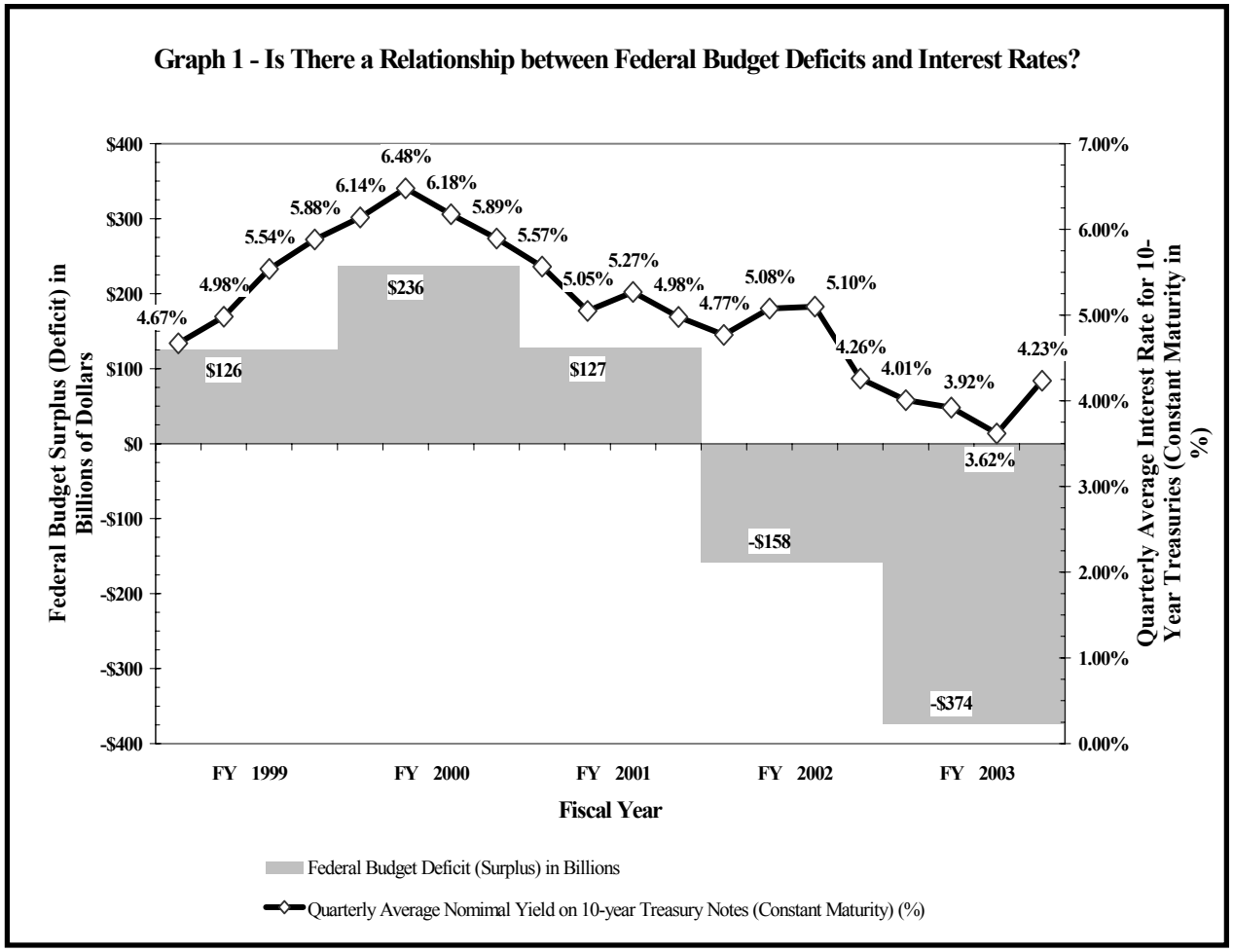
## V. OBSERVATIONS

Turning from an overview of empirical literature to an observation of actual behavior of federal budget surpluses or deficits and nominal interest rates over the half-decade, Graph 1 suggests that any relationship between federal budget deficits or surpluses and interest rates is neither as large nor as consistent as some policymakers assume. For example, compare annual federal budget surpluses or deficits to quarterly average (nominal) yield on 10-year Treasury notes (constant maturity) during the last five fiscal years. Contrary to the crowding out theory, nominal interest rates generally decreased as federal budget surpluses waned and deficits grew. Changes in federal budget deficits or surpluses do not readily correspond to changes in nominal interest rates in a simple way. Other factors, especially the business cycle and monetary policy,

[14] Kevin A. Hassett, "Discussion of the Economic Effects of Long-Term Fiscal Discipline," 2003. This paper will be presented to American Economic Association later this year.

[15] A correctly specified model would successfully isolate the effect of cyclical factors on real interest rates from the effect of public expectations about future federal budget balances or levels of federal debt on real interest rates. If Laubach specified his model correctly, then the addition of proxy variable for cyclical factors such as the unemployment rate to Laubach's model should be statistically insignificant. However, Hassett found that the coefficient associated with the unemployment rate variable in his modified model was statistically significant. Hassett's finding suggests that Laubach's model may not successfully isolate the effect of cyclical factors on real interest rates from the effect of federal budget balances or levels of federal debt on real interest rates. Therefore, a significant part of the fluctuations in real interest rates that Laubach attributes to public expectations about future federal budget balances or levels of federal debt may be, in fact, attributable to cyclical factors.

[16] Hassett (2003).




are clearly more important than the current federal budget surplus or deficit in determining current interest rates.

## VI. CONCLUSION

Do federal budget deficits and the associated increase in the level of federal debt affect real interest rates? Empirical studies have repeatedly failed to find a statistically significant relationship between past or current federal borrowing and current real interest rates. Given this failure, empirical studies have attempted to find statistically significant relationships between current real interest rates and public expectations about future federal borrowing, but have produced mixed results. On balance, the findings of empirical studies suggest that any statistical relationship between past, current, or public expectations about future federal borrowing and current real interest rates, if it does indeed exist, is quite small (measured in tenths of a percentage point).

Robert P. O'Quinn
Senior Economist to the Vice Chairman

## BIBLIOGRAPHY

Barro, Robert J. "Are Government Bonds Net Worth?" *Journal of Political Economy* 83 (November-December 1974): 1095-1117.

Canzoneri, Mathew B., Robert E. Cumby, and Behzad Diba. "Should the European Central Bank and the Federal Reserve be Concerned about Fiscal Policy?" in *Rethinking Stabilization Policy*. Kansas City: Federal Reserve Bank of Kansas City, 2002: 333-382.

Executive Office of the President, Council of Economic Advisers. *Economic Report of the President together with the Annual Report of the Council of Economic Advisors*. Washington, D.C.: Government Printing Office, February 2003.

Gale, William G., and Peter R. Orszag. *The Economic Effects of Long-Term Fiscal Discipline*. Washington, D.C.: Urban-Brookings Tax Policy Center, April 2003.

Hassett, Kevin A. "Discussion of the Economic Effects of Long-Term Fiscal Discipline." 2003.

Kitchen, John. "Domestic and International Financial Market Responses to Federal Deficit Announcements." *Journal of International Money and Finance* 15 (1996): 239-254.

Laubach, Thomas. "New Evidence on the Interest Rate Effects of Budget Deficits and Debt." Board of Governors of the Federal Reserve System Finance and Economics Discussion Series (FEDS) paper (March 2003), found at http://www.federalreserve.gov/pubs/feds/2003/200312/200312pap.pdf.

Quigley, Michael Regan, and Susan Porter-Hudak. "A New Empirical Approach in Analyzing the Effect of Deficit Announcements on Interest Rates." *Journal of Money, Credit, and Banking* 26 (November 1994): 894-902.

Thorbecke, Willem. "Why Deficit News Affects Interest Rates." *Journal of Policy Modeling* 15 (1993): 1-11.