Tax-Spend or Fiscal Illusion?

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> [My opponent] tells us that first we've got to reduce spending before we can reduce taxes. Well, if you've got a kid that's extravagant, you can lecture him all you want to about his extravagance. Or you can cut his allowance and achieve the same end much quicker.
>
> —Ronald Reagan (1980)

> The attractiveness of financing spending by debt issue to the elected politicians should be obvious. Borrowing allows spending to be made that will yield immediate political payoffs without the incurring of any immediate political cost.
>
> —James Buchanan (1984)

What is the intertemporal relationship between U.S. federal government expenditures and revenues? Do variations in revenues cause variations in expenditures *(tax-spend)* or is causation the other way round *(spend-tax)*? Alternatively, is causation bidirectional or nonexistent? Understanding the "revenue-expenditure nexus" has important implications for the political economy of fiscal policies.

For example, if causation is in the tax-spend direction, then there are at least two interpretations. First, there is the conventional tax-spend hypothesis associated with Milton Friedman (1978): Government wants to and will spend whatever is made available. If

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tax revenues are increased, spending will increase; if tax revenues are lowered, the beast is starved. Revenues have a positive causal relationship to expenditures. This view has led various proponents of limited government to encourage tax cuts that are not conditional on offsetting spending cuts. The ultimate goal is for eventual spending cuts as a result of "starving the beast."[1]

On the other hand, a *negative* causal relationship from revenues to expenditures may exist due to fiscal illusion (Wagner 1976, Buchanan and Wagner 1977). Niskanen (1978, 2002, 2006) finds a negative correlation between federal expenditures and tax receipts. He states, "The most direct interpretation [is] a demand curve [where] federal spending is a negative function of the tax price" (Niskanen 2002: 184). A tax increase may make taxpayers hostile toward government spending as they are forced to directly reckon with its costs.[2] Likewise, tax decreases may lessen the perceived cost of government spending, increasing the quantity demanded.

For proponents of limited government, understanding which of these relationships best explains reality is critical in terms of policy. Believers in conventional tax-spend or "starve the beast" may applaud the type of tax cuts associated with Ronald Reagan and George W. Bush because, despite the lack of simultaneous spending cuts, lower taxes are expected to constrain *future* spending. Alternatively, believers in fiscal illusion may view such tax cuts as counterproductive because they perversely encourage even greater spending by decreasing its perceived (by the electorate) price. Fiscal illusionists may instead encourage tax increases (especially during times of budget deficits) because they force the public to confront the costs of excessive spending, hopefully decreasing their tolerance for it.

Ultimately, which relationship best describes the revenue-expenditure nexus is an empirical question and several recent studies using U.S. federal time series data provide evidence for the conventional (Friedman-type) tax-spend hypothesis. Examples include Bohn (1991), Mounts and Sowell (1997), Koren and Stiassny (1998), Garcia and Henin (1999), and Chang, Liu, and Caudill (2002).

[1] See Tempelman (2006) for a review of the historical development of academic and political arguments for and against the "starve the beast" view.
[2] This hypothesis assumes that people do not behave as farsighted members of infinitely lived dynasties (Barro 1974).

However, Baghestani and McNown (1994) find that there is no relationship between revenues and expenditures, and Ross and Payne (1998) provide evidence favoring the spend-tax hypothesis. Payne (2003) provides an excellent survey of the literature for the United States and other nations. All of the recent studies follow the example set early on by Miller and Russek (1989) in estimating error-correction models that allow for long-run fiscal synchronization (cointegration).

Recent U.S. evidence for the fiscal-illusion hypothesis is scant. One exception is a recent paper by Romer and Romer (2007a). They use a measure of "tax changes taken for long-run purposes" based on narrative evidence from government sources (developed in Romer and Romer 2007b). Regressing changes in federal spending on contemporaneous and lagged values of this measure, they find that tax cuts are positively associated with significant increases in expenditures. This sort of perverse effect is precisely the type a fiscal illusionist may fear is associated with tax cuts unaccompanied by spending cuts. However, Romer and Romer do not consider an intertemporal budget constraint for the government and control for budgetary disequilibria in an error-correction framework. Doing so is standard in the literature. This criticism is also applicable to the early findings by Niskanen (1978). Darrat (1998, 2002) finds evidence of the fiscal illusion hypothesis in the context of the revenue-expenditure nexus for Turkey, Lebanon, and Tunisia.

The existing literature uniformly imposes *symmetry* on revenue effects in expenditure equations. This constraint may bias results toward the conventional tax-spend hypothesis because it is based on simple adherence to a budget constraint. In contrast, the fiscal illusion hypothesis—based on the public's subjective perceptions of the cost of government spending—is more plausibly associated with *asymmetric* responses. For example, individuals may be more sensitive to tax increases, seeking to assign blame for those shocks, while tax decreases are more passively accommodated. This may be due to irrationality, but not necessarily. Tax decreases (relative to spending) create future tax liabilities that may or may not be paid during the individual's lifetime. Tax increases, on the other hand, are realized with certainty. Also, an insensitivity to tax decreases relative to increases is consistent with the loss-aversion hypothesis put forth in the prospect theory of Kahneman and Tversky (1979, 1991).

In this article, I evaluate the conventional tax-spend hypothesis versus the fiscal illusion hypothesis by analyzing quarterly data from 1959:3 to 2007:4 on U.S. federal revenues and expenditures within an error-correction framework. The findings suggest that (a) decreases in taxes do not Granger-cause changes in federal expenditures while (b) increases in taxes significantly and negatively affect expenditures. Following Ewing et al. (2006), I also allow for asymmetric responses to long-run budgetary disequilibria. The findings, (a) and (b) from above, are robust to allowing for error-correction asymmetries. This result suggests that fiscal illusion-type effects are present even when controlling for different potential types of intertemporal adjustment to the government's budget constraint.

This article is organized as follows: First, I describe the data and explore their relevant properties for the analysis that follows. Second, I present an overview of the error-correction framework and present the basic results. Third, I explore the robustness of the basic results to asymmetries in the error-correction process. Fourth, I conclude with a brief summary and discuss the policy implications of my results.

The Data and Their Relevance

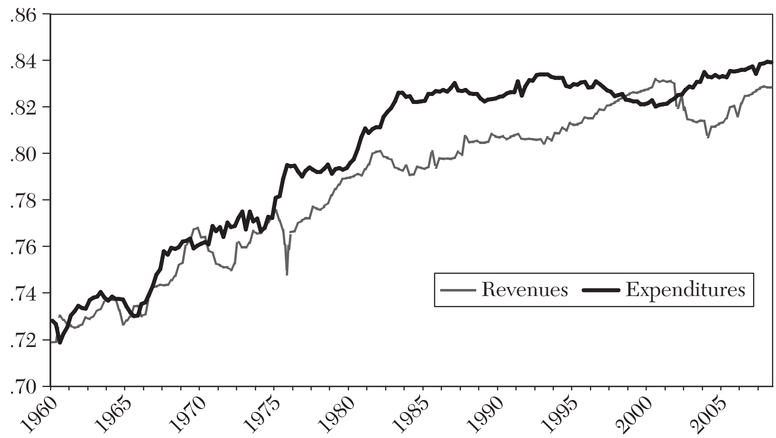
Quarterly data on total receipts and expenditures for the U.S. federal government from 1959:3 to 2007:4 are used in this study.[3] The data are transformed into natural logs and then scaled by the natural log of GDP.[4] These data are basically identical to those used by Ewing et al. (2006) except for slightly longer coverage. Figure 1 plots the scaled time series. Among other features, the persistent budget deficits of the 1980s are clearly visible, as are the subsequent and short-lived Clinton surpluses and the return to deficits under George W. Bush.

Augmented Dickey-Fuller (1979) and Phillips-Perron (1988) unit root tests (Table 1) fail to reject a unit root for both the scaled revenue (r) and expenditures (x) series. For their first differences (Δr

[3]These data are taken from the Bureau of Economic Analysis, Table 3.2, Federal Government Current Receipts and Expenditures. Data are in billions of dollars and are seasonally adjusted.

[4]The data are taken from the BEA Table 1.1.5, Gross Domestic Product. They are in billions of dollars and seasonally adjusted.

FIGURE 1
U.S. FEDERAL REVENUES AND EXPENDITURES:
1959:3–2007:4



NOTE: Revenues and expenditures are logged and taken as ratios of (log) GDP.

and Δx), however, the unit root hypothesis can be easily rejected. Therefore, I focus the analysis on these differenced variables, for which summary statistics are provided in Table 2.

Incorporating Δr and Δx into an error-correction framework makes sense if r and x are not only nonstationary but also cointegrated. I estimate the following relationship by OLS,

(1) $r_t = \beta x_t + \varepsilon_t$.

The error term associated with the above relationship should be stationary if the two variables are cointegrated. In other words, revenue and expenditure levels are ultimately tied to one another by a (long-run) budget constraint. Augmented Dickey-Fuller (ADF) and Phillips-Perron tests both reject the unit root hypothesis at the 1 percent significance level.[5]

[5]The ADF statistic is –2.73 (p-value = 0.01) and the Phillips-Perron statistic is –2.96 (p-value = 0.00). Although economic intuition suggests that a long-run balanced budget condition must hold, I also estimate (1) including an intercept. The resulting residuals are also stationary and have a correlation of 0.91 with the baseline residuals.

TABLE 1
Unit Root Tests on U.S. Federal Revenues and Expenditures

Statistic	r	x
ADF	–2.58	–1.65
	(0.29)	(0.77)
Phillips-Perron	–2.48	–1.19
	(0.34)	(0.91)
	Δr	Δx
ADF	–16.23	–9.07
	(0.00)	(0.00)
Phillips-Perron	–16.23	–15.55
	(0.00)	(0.00)

Notes: Both the ADF and Phillips-Perron tests include constants and linear trends. Numbers in parentheses are p-values. Data cover 1959:3 to 2007:4.

Empirical Framework and Results

Given that U.S. federal government revenues and expenditures are cointegrated, it is appropriate to exploit an error-correction framework. Indeed, Bohn (1991), Mounts and Sowell (1997), Koren and Stiassny (1998), Garcia and Henin (1999), and Ewing et al. (2006) are all based on error-correction models (ECMs). A standard ECM system is,

$$(2)\ \Delta x_t = \gamma_0 + \alpha_1 \Delta x_{t-1} + \ldots + \alpha_p \Delta x_{t-p} + \beta_1 \Delta r_{t-1} + \ldots + \beta_\rho \Delta r_{t-p} + \rho \hat{\varepsilon}_{t-1} + u_t$$

$$(3)\ \Delta r_t = \tilde{\gamma}_0 + \tilde{\alpha}_1 \Delta x_{t-1} + \ldots + \tilde{\alpha}_p \Delta x_{t-p} + \tilde{\beta}_1 \Delta r_{t-1} + \ldots + \tilde{\beta}_\rho \Delta r_{t-p} + \tilde{\rho} \hat{\varepsilon}_{t-1} + \tilde{u}_t$$

where $\hat{\varepsilon}_t$ is the period t estimated residual from the cointegrating relationship (1). The system, (2) and (3), is estimated by OLS. Since the focus of this article is on evaluating the conventional tax-spend hypothesis versus the fiscal illusion hypothesis, I restrict reporting to results from expenditure equations such as (2).

Equation (2) represents the standard hypothesis in the literature whereby changes in revenue have symmetric effects on expenditure

TABLE 2
SUMMARY STATISTICS FOR U.S. FEDERAL REVENUE AND EXPENDITURE CHANGES

	Δr	Δx
Mean	0.000568	0.000577
Maximum	0.018119	0.000280
Minimum	–0.018119	–0.008454
Standard Deviation	0.003352	0.002531
Correlation	–0.183460	–0.183460
Correlation with		
$\Delta r(-1)$	–0.156136	–0.016313
$\Delta r(-2)$	0.115866	–0.074998
$\Delta r(-3)$	–0.071234	0.079624
$\Delta r(-4)$	0.033348	0.166100
Correlation with		
$\Delta x(-1)$	–0.082363	–0.119555
$\Delta x(-2)$	0.023534	0.248538
$\Delta x(-3)$	–0.048255	0.039941
$\Delta x(-4)$	0.145869	0.023482

NOTE: After differencing, the data cover 1959:4 to 2007:4.

changes. I estimate (2) for lag lengths (p) of 1 through 8. The Akaike information criterion (AIC) suggests a lag length of 4 (AIC = –9.2459). The results of that regression are presented on the left-hand side of Table 3. Similar to several previous studies, the hypothesis that the coefficients on revenue changes are jointly 0 is rejected at the 5 percent significance level. This suggests that revenue changes Granger-cause changes in expenditures. Furthermore, Granger causality is based on a positive coefficient on the 4th lag of Δr (β_4). The interpretation of Granger causality here is in terms of the conventional tax-spend hypothesis. With about a 2-year lag, increases (decreases) in federal government receipts result in increases (decreases) in federal government expenditures.

TABLE 3
Results of Estimating Expenditure ECM Equation

Coefficient	Symmetric	Coefficient	Asymmetric
β_1	–0.0293	β_1^{NEG}	–0.0160
	(0.0541)		(0.0902)
β_2	–0.0429	β_2^{NEG}	0.1066
	(0.0545)		(0.0977)
β_3	0.0812	β_3^{NEG}	–0.1087
	(0.0536)		(0.0977)
β_4	0.1508***	β_4^{NEG}	0.2084**
	(0.0528)		(0.0945)
		β_1^{POS}	0.0062
			(0.0933)
		β_2^{POS}	–0.2340**
			(0.0929)
		β_3^{POS}	0.1866**
			(0.0874)
		β_4^{POS}	0.1025
			(0.0874)
ρ	0.0330*	ρ	0.0381**
	(0.0192)		(0.0171)
R^2	0.1482	R^2	0.1930
AIC	–9.2334	AIC	–9.2452
F-stat ($\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$)	2.5254**	*F*-stat ($\beta_1^{NEG} = \beta_2^{NEG} = \beta_3^{NEG} = \beta_4^{NEG} = 0$)	1.8660
		F-stat ($\beta_1^{POS} = \beta_2^{POS} = \beta_3^{POS} = \beta_4^{POS} = 0$)	3.0974**
F-stat ($\beta_1 + \beta_2 + \beta_3 + \beta_4 = 0$)	1.7934	*F*-stat ($\beta_1^{POS} + \beta_2^{POS} + \beta_3^{POS} + \beta_4^{POS} = 0$)	0.1304

Notes: *, **, *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Numbers in parentheses are standard errors. "Symmetric" indicates results from estimation of (2); "Asymmetric" indicates results from estimation of (4).

Now consider an alternative ECM where revenue increases and decreases are allowed to affect expenditures asymmetrically:

$$(4)\ \Delta x_t = \gamma_0 + \alpha_1\Delta x_{t-1} + \ldots + \alpha_p\Delta x_{t-p} + \beta_1^{NEG}D^{NEG}\Delta r_{t-1} + \ldots + \beta_p^{NEG}D^{NEG}\Delta r_{t-p} + \beta_1^{POS}D^{POS}\Delta r_{t-1} + \ldots + \beta_p^{POS}D^{POS}\Delta r_{t-p} + \rho\hat{\varepsilon}_{t-1} + u_t$$

where $D^{POS} = 1$ if $\Delta r > 0$ and 0 otherwise; $D^{NEG} = 1$ if $\Delta r < 0$ and 0 otherwise.[6] Specification (4), in a straightforward way, allows for changes in federal government revenues to have different effects on expenditures depending on whether those revenue changes are positive or negative. I estimate (4) for lag lengths (p) of 1 through 8. The AIC again suggests a lag length of 4.

The right-hand side of Table 3 presents the results of incorporating asymmetric effects. The first statistic to note is the R^2, which rises from 0.1482 to 0.1930 when asymmetric effects are permitted. This result is to be expected given the greater number of explanatory variables. However, the AIC, which imposes a penalty for including additional variables (explanatory power being equal), also falls slightly from –9.2334 to –9.2452, despite the addition of four additional terms. These statistics suggest that the data are more consistent with the asymmetric model than with the symmetric alternative.

In the case of the asymmetric ECM, the null hypothesis of no Granger causality cannot be rejected at the 10 percent significance level for negative revenue changes. However, the null hypothesis can be rejected for positive changes at the 5 percent significance level. That revenue increases Granger-cause expenditure changes is based on significant coefficients on the 2nd and 3rd lags of Δr: –0.2340 and 0.1866 respectively, both significant at the 5 percent level. Given these coefficient estimates, a reasonable interpretation is that an increase in federal receipts leads to a *decrease* in government expenditure about two quarters later. This is inconsistent with conventional tax-spend and consistent with fiscal illusion effects. The relative point estimates imply that the associated expenditure decrease only partially reverses itself in the following quarter. However, the null hypothesis that $\beta_1^{POS} + \beta_2^{POS} + \beta_3^{POS} + \beta_4^{POS} = 0$ cannot be rejected.

Robustness to Asymmetric Error Correction

We can now examine the robustness of the earlier results with respect to an extension of the basic ECM explored by Ewing et al.

[6]The issue of $\Delta r = 0$ does not occur in the data.

(2006). These authors apply the threshold autoregression (TAR) and momentum threshold autoregression models (M-TAR) of Enders and Granger (1998) and Enders and Siklos (2001) to test the symmetry assumption of the ECM with respect to budgetary disequilibria. Based on these models, Ewing et al. (2006) reject the symmetry null hypothesis.

Checking the robustness of the present results to asymmetric adjustment to budgetary disequilibria is important. If, for example, the federal government adjusts more quickly to large deficits than to surpluses or small deficits (say, because large deficits are ultimately not sustainable and politicians or the electorate recognize this) then the ECM is misspecified. In particular, the negative relationship between tax increases and spending may not be indicative of the fiscal illusion story told above but may, instead, be capturing the (omitted) mechanism through which adjustment to budgetary disequilibrium occurs. In other words, if deficits get large enough, adjustment occurs through raising taxes and decreasing spending.

TAR and M-TAR models are estimated using the residuals ($\hat{\varepsilon}_t$) from the estimated cointegration relation, (1). Each model is based on estimating,

(5) $\Delta\hat{\varepsilon}_t = I_t\rho_1\hat{\varepsilon}_{t-1} + (1 - I_t)\rho_2\hat{\varepsilon}_{t-1} + \alpha_1\hat{\varepsilon}_{t-1} + \dots + \alpha_p\hat{\varepsilon}_{t-p} + \upsilon_t$

where, for TAR and M-TAR respectively,

(6) $I_t = 1$ if $\hat{\varepsilon}_{t-1} \geq \tau$ and 0 if $\hat{\varepsilon}_{t-1} < \tau$

(7) $I_t = 1$ if $\Delta\hat{\varepsilon}_{t-1} \geq \tau$ and 0 if $\Delta\hat{\varepsilon}_{t-1} < \tau$

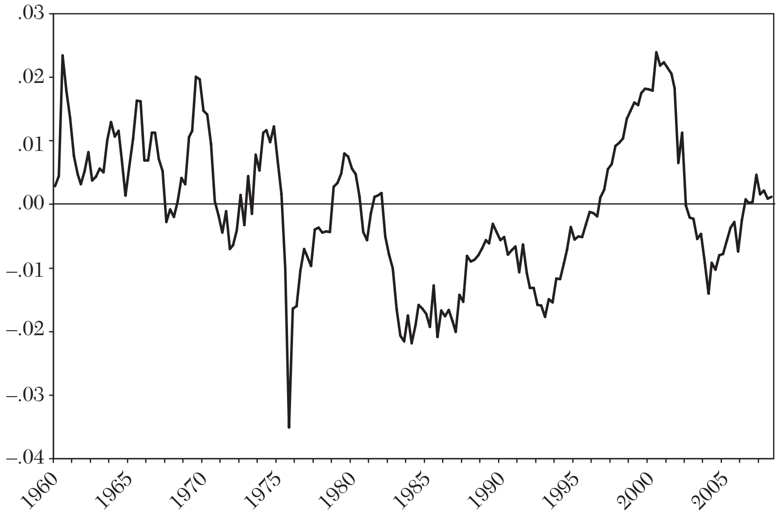
The threshold, τ, is determined endogenously using Chan's (1993) method:

(i) arrange the $\hat{\varepsilon}_t$*'s* (TAR) or $\Delta\hat{\varepsilon}_t$*'s* (M-TAR) in increasing order, (ii) exclude the smallest and largest 15 percent of the observations, (iii) choose $\hat{\tau}$ out of the remaining 70 percent of observations associated with the smallest SSR from OLS regression of (5).

Given $\hat{\tau}_{\text{TAR}}$ and $\hat{\tau}_{\text{M-TAR}}$, for each model the relevant null hypothesis is H_0: $\rho_1 = \rho_2$ (i.e., symmetric adjustment to budgetary disequilibria). As well, the threshold values can be used to estimate an ECM with both short-run and long-run asymmetric effects,

(8) $$\Delta x_t = \gamma_0 + \gamma_1\Delta x_{t-1} + \dots + \alpha_p\Delta x_{t-p} + \beta_1^{NEG}D^{NEG}\Delta r_{t-1} + \dots + \beta_p^{NEG}D^{NEG}\Delta r_{t-p} + \beta_1^{POS}D^{POS}\Delta r_{t-1} + \dots + \beta_p^{POS}D^{POS}\Delta r_{t-p} + I_t\rho_1\hat{\varepsilon}_{t-1} + (1 - I_{t-1})\rho_2\varepsilon_{t-1} + u_t.$$

FIGURE 2
U.S. Federal Budgetary Disequilibrium



Note: Time series is the estimated relationship from the cointegrating relationship (1) between federal revenues and expenditures.

In (8), ρ_1 represents the effects of above-threshold budgetary disequilibria and ρ_2 represent the effects of below-threshold budgetary conditions.

Table 4 demonstrates that, for a choice of either p = 2 or 4 in estimating (5), the chosen TAR or M-TAR thresholds are the same ($\hat{\tau}_{TAR}$ = 0.0025 and $\hat{\tau}_{M\text{-}TAR}$ = 0.0040). This outcome is reassuring because, though the AIC favors p = 2 for both TAR and M-TAR, the threshold is not sensitive to a chosen lag structure consistent with the p = 4 used in the previous regressions.

Results of estimating (8) using *I*'s defined by the estimated thresholds are presented in Table 5. One interesting result is that, while both TAR and M-TAR models strongly reject symmetric adjustment to budgetary disequilibria, the nature of the asymmetry is completely different depending on the model. So the M-TAR results suggest that ρ_2 is statistically significant and large relative to ρ_1, which is insignificant. Ewing et al. (2006) report M-TAR results and, based on those, argue that expenditures only respond to "worsening" budget-

TABLE 4
Estimated Threshold Values for TAR and M-TAR Models

Coefficient		TAR	M-TAR
$p = 2$			
	ρ_1	–0.3345***	–0.0198
	ρ_2	–0.0455	–0.2522***
	τ	0.0025	0.0040
		(1959.3; 0.0029)	(1959.4; 0.0030)
AIC		–8.1785	–8.1796
$p = 4$			
	ρ_1	–0.3266***	–0.0222
	ρ_2	–0.0352	–0.2440***
	τ	0.0025	0.0040
		(1959.3; 0.0031)	(1959.4; 0.0030)
AIC		–8.1719	–8.1574

Notes: *, **, *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Numbers in parentheses are, first, the date associated with the threshold residual value and, second, the SSR associated with the model regression using that threshold. The parameter estimates of $\rho 1$ and $\rho 2$ correspond to equation (5).

ary conditions (by which they mean below-threshold disequilibria). However, the TAR model results suggest the exact opposite: expenditures respond only to above-threshold disequilibria. (Note that the TAR model's R^2 is slightly higher.)[7]

Whether more faith is placed in the M-TAR or TAR results is of second-order importance for the issues explored here. The important point is that a range of adjustments to budgetary disequilibria have been allowed for and the earlier results are robust: Revenue increases Granger-cause expenditure changes two quarters later, and

[7]Ewing et al. (2006) use a two-lag specification where the M-TAR R^2 *is* slightly higher than in the TAR model. However, the key point seems to be that, while differences in explanatory power are small, the choice of TAR or M-TAR results in one or another wildly different conclusions concerning asymmetric error-correction.

TABLE 5
RESULTS OF ESTIMATING TAR AND M-TAR VERSIONS OF EXPENDITURE EQUATION

Coefficient	TAR	M-TAR
β_1^{NEG}	–0.0088	–0.0635
	(0.0864)	(0.0917)
β_2^{NEG}	0.1430	0.1503
	(0.0941)	(0.0984)
β_3^{NEG}	–0.0833	–0.1010
	(0.0939)	(0.0965)
β_4^{NEG}	0.1735*	0.2116**
	(0.0910)	(0.0934)
β_1^{POS}	0.0022	0.0256
	(0.0894)	(0.0925)
β_2^{POS}	–0.2557***	–0.2328**
	(0.0892)	(0.0925)
β_3^{POS}	0.1502*	0.1777**
	(0.0843)	(0.0864)
β_4^{POS}	0.0988	0.0886
	(0.0758)	(0.0784)
ρ_1	0.1791***	0.0134
	(0.0384)	(0.0200)
ρ_2	0.0060	0.0932***
	(0.0182)	(0.0293)
R^2	0.2627	0.2168
AIC	–9.3249	–9.2645
F-stat	1.8045	2.3887*
($\beta_1^{NEG}= \beta_2^{NEG}= \beta_3^{NEG}= \beta_4^{NEG}= 0$)		
F-stat	3.2385**	2.9064**
($\beta_1^{POS}= \beta_2^{POS}= \beta_3^{POS}= \beta_4^{POS}= 0$)		
F-stat	0.0007	0.1240
($\beta_1^{POS}+ \beta_2^{POS}+ \beta_3^{POS}+ \beta_4^{POS}= 0$)		
F-stat	16.4425***	5.2746**
($\rho_1 = \rho_2$)		

NOTES: *, **, *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Numbers in parentheses are standard errors.

the effect is negative and only partially reversed in the following quarter. One notable difference is in the M-TAR model where the null hypothesis of no Granger causation can be rejected for negative (as well as positive) revenue changes. Taken at face value, the M-TAR model associates decreases in federal revenues with conventional tax-spend effects. However, it is again noted that the R^2 is in favor of (i.e., higher in the case of) the TAR model where only revenue increases Granger-cause expenditures.

Conclusion

The existing literature on the U.S. federal government revenue-expenditure nexus is mixed. There exist studies supporting no short-run causal relationship between revenues and expenditures, as well as both spend-tax and tax-spend views. Within the literature claiming to establish a causal link from changes in revenues to expenditures, the conventional, Friedman-type tax-spend view has been almost ubiquitous. Evidence of the competing fiscal illusion hypothesis has largely been absent. According to this hypothesis, increases (decreases) in revenues increase (decrease) the perceived cost of government leading to decreases (increases) in the quantity demanded of expenditures.

Using quarterly U.S. data from 1959:3 to 2007:4, I demonstrate that allowing revenue increases and decreases to asymmetrically affect expenditures in an otherwise standard error-correction model leads to evidence of fiscal illusion. Specifically, conventional tax-spend partial correlations appear to be those associated with revenue decreases but are not significant in a Granger-causal sense. Alternatively, revenue increases Granger-cause *decreases* in federal government expenditures. This result is robust to incorporating asymmetric, long-run adjustments to budgetary disequilibria (error-correction).

For advocates of reining in an expanding federal government, the results here do not provide strong support for "starve-the-beast" type of policies. Perhaps counter-intuitively, the findings suggest that tax *increases*—even temporary—may serve to decrease expenditures by forcing the public to reckon with the cost of government spending. The findings suggest that the electorate has to be clearly presented with the bill to recognize the cost of government, rather than being allowed to run up a tab.

This article should be viewed as a starting point for reconsideration of the importance of the fiscal illusion hypothesis. This reconsideration comes at an important time. The current decade has been characterized by the reappearance of federal budget deficits and the repeated call for tax cuts with offsetting cuts in spending. Aside from the econometric results presented in this article, recent experience may support a healthy skepticism toward "starve-the-beast" policies.

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