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10 November 2008

Online at <https://mpa.ub.uni-muenchen.de/50121/>  
MPRA Paper No. 50121, posted 24 Sep 2013 01:33 UTC

### Do Government-Spending-Induced Deficits Lower Tax Compliance?

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This study empirically investigates the deficit/tax-compliance-crowding-out hypothesis that higher federal budget deficits from increased government spending lead to decreased aggregate federal personal income tax compliance in the United States. The study adopts annual data on aggregate federal personal income tax evasion for the period 1960-2001. After allowing for factors such as the effective federal income tax rate, IRS tax return audit rates, interest rate penalties assessed by the IRS on detected underreported taxable income, the incentive to engage in legal tax avoidance, and the unemployment rate, it is found that income tax evasion is an increasing function of budget deficits resulting from government spending increases. Important policy implications of this finding are also provided.

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#### Introduction

This report seeks to add to the rich literature on income tax evasion and the underground economy by investigating whether federal budget deficits attributable to government spending increase the incentive to engage in personal income tax evasion. In the United States, the federal budget was in surplus from fiscal 1998 to fiscal 2001. However, given the recession of 2001, a sluggish economy, tax cut legislation enacted in 2001 and 2003, and the "war on terror" declared in the aftermath of the

terrorist attacks of September 11, 2001, federal budget deficits have reappeared. Krueger (2003) warns that federal budget deficits have returned as a major problem and that with the impending retirement of the first baby boomers, the red ink is likely to continue "as far as the eye can see." Similarly, then-U.S. Comptroller General Walker (2003, p. A12) observed: "The days of surpluses are gone, and our current and projected budget situation has worsened significantly." Walker (2003, p. A12) added, "The bottom line is, there is little question that deficits matter, especially if they are large, structural, and recurring in nature." Indeed, Krueger (2003) envisions future budget deficits as raising interest rates and crowding out private investment in new plant and equipment in years to come.

The present study considers budget deficits from a different and perhaps less obvious perspective. Namely, do budget deficits themselves, when they are the result of government spending increases (as opposed to income tax rate cuts) act to "crowd out" tax compliance? If the answer to this question is indeed yes, government-spending-driven budget deficits may be to some extent self-aggravating, implying that the need to have government budgetary/fiscal responsibility is even greater than argued. In the first part, this article is motivated by Lee and Vedder's (1996) finding that taxpayers actually favor deficit reduction in lieu of tax cuts. The second part of this article provides the basic model and formally identifies the variables in the system. In doing so, the deficit/tax-compliance-crowding-out hypothesis involving the government budget deficit/tax evasion linkage is provided. The third part describes the data set used to test the model and provides the empirical findings. A summary along with public policy implications are found in the fourth part.

#### The Framework

The economic system is composed of agents who generate economic value that is reflected in the form of a flow of taxable income. For the case of the United States, these economic agents choose whether to report all, some, or none of their taxable income to the IRS. To the degree that the income is reported to the IRS, a tax liability may be incurred. In the present study, we intend to model the behavior of U.S. workers who choose not to report all of their income.

The probability that the representative economic agent will not report his taxable income to the IRS is treated as an increasing function of the expected gross benefits to the agent of not reporting income,  $E(b)$ , and a decreasing function of the expected gross costs to the agent of not reporting income,  $E(c)$ . Thus, the probability of not reporting income to the IRS,  $P(nr)$ , is described for the representative economic agent by:

$$(1) P(nr) = f[E(b), E(c)], f_{E(b)} > 0, f_{E(c)} < 0$$

The gross benefits from not reporting income to the IRS are expected to be an increasing function of the federal personal income tax rate, *ceteris paribus* (Tanzi, 1982, 1983; Clotfelter, 1983; Feige, 1994; Cebula, 2001). To reflect the federal personal income tax rate, most previous studies using official data have adopted either of two alternative measures: the average effective federal personal income tax rate (*AEPT*) or the maximum marginal federal personal income tax rate. This study adopts the *AEPT* measure because, as argued in Feige (1994), it presumably is more accurate in representing the tax rate confronting a larger portion of the populace. It is the more relevant income tax rate measure for taxpayers as a whole. Accordingly, it is hypothesized that:

$$(2) E(b) = h(AEPT), h_{AEPT} > 0$$

Also, the higher the unemployment rate, *UR*, the greater may be the incentive to underreport income. As the unemployment rate rises, it may lead to fears of further increases in unemployment. In turn, the greater the fear of future unemployment, the greater the degree to which employed or self-employed persons may wish to insulate themselves by underreporting income and saving the unpaid income taxes for a "rainy economic day." Hence, it is hypothesized that the higher the unemployment rate, the greater the degree of income tax evasion. This variable has generally been overlooked by the tax evasion literature. Equation (2) becomes:

$$(2') E(b) = h(AEPT, UR), h_{AEPT} > 0, h_{UR} > 0$$

This article also allows for the potential impact of legal income tax avoidance on illegal income tax evasion. By way of background, in the United States, state and local governments, subject to some statutory restrictions, can issue and sell bonds, the interest on which is exempt from the purchaser's federal income taxation. The tax-free feature of these bonds enables city, county, and state governments to borrow funds at a lower cost than otherwise would be the case because investors are willing to accept a lower pretax return given that they are logically more interested in the after-tax return on bond holdings. Thus, the return on tax-free bonds (municipal bonds) provides a legal vehicle for tax avoidance. To integrate this consideration into the analysis, we test the hypothesis that the higher the tax-free interest rate yield on high-grade municipal bonds (*TF*) relative to, say, the taxable interest rate yield on high quality bonds or notes such as 10-year Treasury notes (*TEN*), the greater the incentive to engage in legal tax avoidance and the lower the incentive to engage in tax evasion. Thus, the greater the ratio of *TF* to *TEN*, the lower the expected benefits of tax evasion, *ceteris paribus*, so that (2') now becomes:

$$(2'') E(b) = h(AEPT, UR, TF | TEN), h_{AEPT} > 0, h_{UR} > 0, h_{TF | TEN} < 0$$

It is hypothesized that many taxpayers may exhibit behavior reflecting what is referred to in this study as the deficit/tax-compliance-crowding-out hypothesis, according to which many households engage in decreased tax compliance (greater income tax evasion) to save more for their own futures whenever the government incurs a budget deficit resulting from increased government spending. To understand this hypothesis, the concept of "ultrarationality" developed by David and Scadding

(1974) is useful. Their hypothesis is based on the simple assumption that households consider the government sector and the business/corporate sector as extensions of themselves — as instruments for their own private interests. This ultrarationality assumption implies "displacement effects" of government outlays, labeled as "ex ante crowding out." According to this concept, government deficits allegedly displace private investment expenditures dollar for dollar since the former is allegedly viewed as public investment and substitutes perfectly for private investment because households tend to classify both items in terms of future household consumption requirements. Stated somewhat differently, the David and Scadding (1974) analysis hypothesizes substitution between public spending and private spending. Logically extending this perspective, then, the present study argues that it also can be inferred that public saving is also a substitute for private saving; this inference is the foundation of the deficit/tax-compliance-crowding-out hypothesis.

The deficit/tax-compliance-crowding-out hypothesis developed here holds that there exists for much of the household sector a de facto social contract that the federal government serves in part as the household sector's "economic shield." This mindset may have its roots in the establishment of the Social Security system, the myriad government pension plans for government employees, Medicare, cost of living adjustments in Social Security and federal pensions, and other forms of federal-government-provided economic insulation from a risky and uncertain world.

If the federal government fails to save because of government-spending-increase policies (as opposed to tax rate cuts) and thereby fails to keep those programs solvent in the eyes of the household sector, the federal government is viewed as perpetrating a breach of social contract. The penalty for this budget deficit can assume the form of decreased income tax compliance, which yields the potential benefit for the participating households of enabling them to fill the savings deficiency created by the government-spending-driven budget deficit by saving tax-evasion dollars for themselves. Thus, although the underlying motivation differs from that found in "Ricardian equivalence," the household behavior is qualitatively very similar: budget deficits (resulting from government spending increases) elicit increased household savings, except that in the present case tax evasion (noncompliance) becomes a source of funding for the increased private saving.

Of course, it is not all that different to consider that Ricardian households, to offset the expectations of higher future taxes without forgoing current consumption, may save more today in the form of income tax noncompliance. Indeed, the government budget deficit may be the result of what had been previously observed as a relatively low level of consumption expenditures by households. That is, households might not want to reduce spending lower than what it already is, although also being mindful that a tax increase may be looming in the

future.<sup>1</sup> The appealing aspect of the present explanation of household behavior is that one of the rather heroic assumptions for Ricardian equivalence, a perfect capital market, is not implied here. Rather, the hypothesized behavior of households is based on when it actually fails to hold. If tax evasion is considered a means of "savings-of-last-resort," households affected by liquidity constraints are more likely to reach this last resort.

To the extent that either or both explanations stimulate action by households, it is argued that the larger the federal budget deficit (*DEFY*), the less the degree of tax compliance and hence the greater the degree of personal income tax evasion since that deficit acts to crowd out or discourage tax compliance. Note, however, that the validity of this hypothesis, statistical evidence notwithstanding, is most likely conditional on the source of the budget deficit. In general, the budget deficit arises from an increase in government expenditures, a decrease in taxes, or some combination of both. It would seem less likely that households will demonstrate the behavior detailed in our hypothesis if the budget deficit arises strictly from a decrease in taxes, as this would not appear to households as a fracture in the economic shield. This will be discussed more completely below. Equation (2'') now is given by:

$$(2'') E(b) = h(AEPT, UR, TF | TEN, DEFY); h_{AEPT} > 0, h_{UR} > 0, h_{TF|TEN} < 0, h_{DEFY} > 0$$

The expected gross costs of not reporting income to the IRS are hypothesized to be an increasing function of the risks thereof (Erard and Feinstein, 1994; Cebula, 2001). In this study, to the representative economic agent, the expected penalty from not reporting or from under-reporting taxable income to the IRS, is enhanced by two factors: an increase in the percentage of filed federal personal income tax returns that is formally audited by IRS examiners/personnel (*AUDIT*); and an increase in the interest rate (*INTEREST*) used to assess penalties on tax liabilities associated with detected unreported income. Clearly, the experience of an IRS tax audit would imply nonpecuniary, or psychic, costs as well as pecuniary costs (including outlays for legal or other representation, along with the value of one's own time) above and beyond any potential added taxes, penalties, and interest assessed by the IRS. A higher audit rate would thus imply a greater risk of incurring such costs and act to discourage tax evasion. Also, a higher interest rate charged by the IRS on taxes due on detected unreported income would raise the expected costs of tax evasion and thereby discourage the same. Thus, we have:

$$(3) E(c) = j(AUDIT, INTEREST); j_{AUDIT} > 0, j_{INTEREST} > 0$$

Substituting (2'') and (3) into (1) yields:

$$(4) P(nr) = b[AEPT, UR, TF | TEN, DEFY, AUDIT, INTEREST]; b_{AEPT} > 0, b_{UR} > 0, b_{TF|TEN} < 0, b_{DEFY} > 0, b_{AUDIT} < 0, b_{INTEREST} < 0$$

### Income Tax Evasion and Budget Deficits

Before providing empirical evidence regarding the deficit/tax-compliance-crowding-out hypothesis, it is necessary to discuss the data adopted for measuring the aggregate degree of federal personal income. A variety of studies have endeavored to estimate the magnitude of personal income tax evasion, including Tanzi (1982, 1983), Feige (1989, 1994, 1996), and Ledbetter (2004). Predicated on such studies, there appear to be three basic approaches to estimating the degree of aggregate personal income tax evasion: the aggregate adjusted gross income gap approach, the Taxpayer Compliance Measurement Program, and currency ratio models, including the general currency ratio model.

The aggregate AGI gap data are compiled by the Bureau of Economic Analysis, which computes the discrepancy between the aggregate AGI reported to the IRS and an independent estimate of the aggregate AGI derived from the National Income and Product Accounts estimate of aggregate personal income (see, for example, Ledbetter, 2004).

The estimates by Tanzi (1982, 1983) and Feige (1989, 1994, and 1996) are well known and considered reliable and technically sound. However, the aggregate AGI gap series is the one adopted in the present study. This series from Ledbetter (2004) constitutes official observed government data compiled for all years beginning with 1960 and ending with 2001. As a result, the AGI gap series provides the most current estimate of aggregate personal income tax evasion of any of these approaches.

Because of data limitations on two of the explanatory variables in the system, *AUDIT* and *INTEREST*, the study period begins with 1960. The AGI gap series is available from 1960 through 2001. Accordingly, the study period runs from 1960-2001. Based on the framework provided in (4) above, the following reduced-form equation is:

$$(5) (REL\ AGI\ GAP)_t = a_0 + a_1 AEPT_{t-1} + a_2 UR_{t-1} + a_3 (TF/TEN)_{t-1} + a_4 DEFY_{t-1} + a_5 AUDIT_{t-1} + a_6 INTEREST_{t-1} + a_7 (-1)MAXCH_{t-1} + a_8 INTERACTION + u$$

where:

$(REL\ AGI\ GAP)_t$  = the relative AGI gap in year  $t$ , expressed as a percentage of GDP in year  $t$ ;

$a_0$  = constant term;

$AEPT_{t-1}$  = the average effective federal personal income tax rate in year  $t-1$ ;<sup>2</sup>

$UR_{t-1}$  = the average annual unemployment rate of the civilian labor force in year  $t-1$ ;

$(TF/TEN)_{t-1}$  = the ratio for year  $t-1$  of the average annual tax-free interest rate yield on high grade

<sup>1</sup>A common assumption for Ricardian equivalence is that the current generation has some concern for all future generations. This is in case the tax increase required from the budget deficit does not occur for a relatively longer period after the deficit. Of course, motivation of noncompliance can also occur as long as households consider that the increase will occur during their lifetime.

<sup>2</sup>In the present investigation, variable *AEPT* is total federal government income tax receipts from individuals divided by the reported aggregate AGI.

municipal bonds to the average annual taxable interest rate yield on 10-year U.S. Treasury notes;

$DEFY_{t-1}$  = the ratio of the total nominal federal budget deficit in year  $t-1$  to the nominal GDP in year  $t-1$ ;

$AUDIT_{t-1}$  = the percentage of filed federal personal income tax returns in year  $t-1$  that was subjected to a formal IRS audit involving IRS examiners;

$INTEREST_{t-1}$  = the average annual interest rate charged by the IRS on unpaid tax liabilities (plus penalties, if applicable) on past detected unreported taxable income in year  $t-1$ , per annum;

$(-1)MAXCH$ ,  $INTERACTION$  = explained below; and

$u$  = stochastic error term.

The data are annual. The data for  $AEPT$ ,  $INTEREST$ , and  $AUDIT$  were obtained from the IRS (1960-2003). The variable  $UR$  was obtained from the Council of Economic Advisers (CEA, 2004, Table B-42). The  $DEFY$  variable was obtained from the CEA (2004, Table B-79). We multiplied the series by  $(-1)$  to get it in absolute terms, and as is common practice in the empirical macroeconomics literature, the deficit is expressed relative to the size of GDP (Hoelscher, 1986; Ostrosky, 1990). The data for computing the  $TF/TEN$  variable were obtained from the CEA (2004, Table B-73). The series adopted to measure the variable  $RELIGIGAP$  were obtained from Ledbetter (2004, Table 5).

The Phillips-Perron unit root test indicates that the variable  $TF/TEN$  is stationary in levels, whereas the variables  $RELIGIGAP$ ,  $AEPT$ ,  $DEFY$ ,  $INTEREST$ ,  $UR$ , and  $AUDIT$  are stationary only in first differences. Accordingly, in the estimation, the latter group of variables is expressed in first differences in the estimation.

To the extent that budget deficits have a different effect on tax evasion when the deficit is a function of a decrease in taxes, we could observe this through inclusion of an interaction term in the model. The variable  $(-1)MAXCH$  is the change in the maximum marginal federal personal income tax rate multiplied by  $(-1)$ . Its expected sign is negative to reflect the possibility that a tax rate decrease reduces tax evasion.  $INTERACTION$  is an interaction term between the federal budget deficit (as a percent of GDP) and the change in the maximum marginal federal personal income tax rate. The expected sign on this term is negative, which implies that the partial effect of budget deficits on tax evasion is positive (if this hypothesis is not rejected), yet decreasing when the deficit is a function of a tax decrease, everything else being constant.<sup>3</sup> Thus, although taxpayers despise deficits (as explained above), they are forgiving of those resulting from tax rate cuts.

The ordinary least squares estimation of equation (5), adopting the White (1980) heteroskedasticity correction, is:

$$(6) z(RELAGIGAP)_t = +0.55 + 0.43 zAEPT_{t-1}$$

<sup>3</sup>From equation (5), the partial effect of budget deficits on tax evasion is  $\frac{\Delta RELAGIGAP}{\Delta DEFY} = a_4 - a_8(-1)MAXCH$  where time subscripts have been removed.

$$\begin{aligned} & (+0.28)(+3.50) \\ & + 0.314 zUR_{t-1} - 0.43 (TF/TEN)_{t-1} + 0.52 zDEFY_{t-1} \\ & (+2.93) \quad (-0.19) \quad (+4.90) \\ & - 0.04 zAUDIT_{t-1} - 0.002 zINTEREST_{t-1} \\ & (-0.11) \quad (-0.20) \\ & + 0.0086 (-1)MAXCH_{t-1} - 0.369 INTERACTION, \\ & (+0.39) \quad (-2.23) \end{aligned}$$

$$F = 4.81, DW = 2.02, Rho = -0.02, R^2 = 0.60, adjR^2 = 0.47,$$

where terms in parentheses are  $t$ -values and  $z$  is the first-differences operator.

In equation (6), all six estimated coefficients on the primary explanatory variables exhibit the hypothesized signs, with three of those coefficients statistically significant at beyond the 1 percent level. The coefficient of determination is 0.60, so that the model explains roughly three-fifths of the variation in the change in the aggregate degree of federal personal income tax evasion. The  $F$ -statistic is significant at the 1 percent level. Based on the Durbin-Watson and  $Rho$  statistics, there is no evidence suggestive of autocorrelation.

The estimated coefficient on the  $AEPT$  variable is positive and significant at the 1 percent level. Thus, the higher the average effective federal personal income tax rate, the greater the degree of income tax evasion by households. This finding is consistent with the conventional wisdom and with several previous studies using official data, for example, Clotfelder (1983), Slemrod (1985), and Feige (1994).

The estimated coefficient on the  $UR$  variable is positive and significant at the 1 percent level. Thus, as hypothesized, the higher the unemployment rate of the civilian labor force, the greater the public's perceived need to make allowance for funds to make ends meet and hence the lower the degree of tax compliance — the greater the aggregate degree of personal income tax evasion.

The estimated coefficient on the  $TF/TEN$  variable is negative, as hypothesized, but not statistically significant at an acceptable level. Thus, in this analysis it appears that the ratio of the tax-free interest rate yield on municipal bonds to the taxable yield on 10-year Treasury notes may not significantly affect the AGI gap series for the aggregate degree of federal personal income tax evasion (expressed in first differences).

The estimated coefficient on the  $AUDIT$  variable is positive but not statistically significant at even the 10 percent level, contradicting the conventional wisdom that higher audit rates act to discourage income tax evasion. Although the estimated coefficient on the  $INTEREST$  variable is negative, it is also not significant at even the 10 percent level, implying that an increase in the interest rate that taxpayers must pay to the IRS on taxes due on unreported past taxable income that is detected fails to act as a deterrent for tax evasion on current income.

Finally, the estimated coefficient on the deficit ( $DEFY$ ) variable is positive and statistically significant at well beyond the 1 percent level. Thus, it appears, as hypothesized in this article, that the greater the federal budget

deficit (expressed here as a percentage of GDP), the greater the degree to which taxpayers engage in personal federal income tax evasion and reduce their tax compliance. This provides strong empirical support for the deficit/tax-compliance-crowding-out hypothesis. However, because we include the interaction term, the coefficient on *DEFY* measures its effect on tax evasion when  $(-1)MAXCH$  is zero. That is, when the deficit is strictly a function of an increase in government spending, we can expect an increase in tax evasion. We find this support persuasive given that there were no changes in  $(-1)MAXCH$  for more than 70 percent of the time-series studied. Also, there were only four years during the study period in which the United States witnessed a federal budget surplus (and it was typically small relative to the size of GDP).

The results must also be interpreted within the context of the variables  $(-1)MAXCH$  (which is not significant), and *INTERACTION* (which is negative and significant at the 4 percent level).<sup>4</sup> In other words, there is an interaction effect between *DEFY* and  $(-1)MAXCH$  and to summarize the effect of *DEFY* on tax evasion, we should evaluate the partial effect when  $(-1)MAXCH$  does not equal zero. That is, we should seek evidence that the effect of federal budget deficits on tax evasion is less pronounced when the deficit is a function of a decrease in income tax rates. Using the mean value (1.35 percent), we reran an auxiliary regression replacing *INTERACTION* with *INTERACTION2*.<sup>5</sup> Combined, these results, along with that on the *DEFY* variable, imply not only that the above conclusion is supported, but also that if the budget deficit is the result of an income tax rate cut, tax evasion does not increase. Indeed, it may well decrease. In any event, it appears that higher budget deficits resulting in government spending increases do likely induce increased tax evasion.

### Conclusion

This article has examined the hypothesis that larger federal budget deficits resulting from increased government spending (as opposed to tax rate cuts) create an incentive for taxpayers subject to the behavior embodied in the deficit/tax-compliance-crowding-out hypothesis to engage in greater federal personal income tax evasion. Government-spending-induced federal budget deficits crowd out tax compliance.

The study period is 1960-2001. The AGI gap approach is adopted to measure the aggregate degree of federal personal income tax evasion (Ledbetter, 2004). The empirical estimate reveals strong evidence that the greater

the total government-spending-induced federal budget deficit (measured in this study as a percentage of the GDP), the greater the degree of federal income tax evasion by households. This finding provides potential support for the deficit/tax-compliance-crowding-out hypothesis offered in this study. However, we remain mindful that the suggested behavior of households is most likely conditional on the budget deficit occurring as the result of at least some increase in government expenditures. If the empirical results are valid, it implies that, over time, the greater the government-spending-induced federal budget deficit (relative to the size of the economy), the lower the Treasury's income tax revenue will be and hence the higher the federal budget deficit will then become, *ceteris paribus*. Thus, a hidden danger in the recent reappearance of large budget deficits is that future projections of those deficits may prove to be more downward biased than previously believed. Given the potential implications of budget deficits for interest rates, capital formation, economic growth, global economic competitiveness and outsourcing, and living standards, the economic impacts of prolonged enormous budget deficits could be traumatic to the longer-term U.S. economic outlook. Thus, there appears to be an additional source of support for former Fed Chairman Alan Greenspan's (2005, p. A1) assertion that the current budget deficit pattern is unsustainable.

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<sup>4</sup>However, an *F*-test for the joint hypothesis that *DEFY*,  $(-1)MAXCH$ , and *INTERACTION* are all equal to zero yielded an *F* = 24.51.

<sup>5</sup>The variable *INTERACTION2* is defined as  $(DEFY - 1.35) * (-1)MAXCH$ . The partial effect of *DEFY* on tax evasion (*RELAGIGAP*) when  $(-1)MAXCH = 1.35$  is  $0.52 + (-0.369)(1.35) = 0.02$ . The standard error on *INTERACTION2* is 0.033. Therefore, using a *t*-test, we cannot reject the null hypothesis that the partial effect of *DEFY* on tax evasion is equal to zero when  $(-1)MAXCH = 1.35$ .

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