Teaching Political Economy: On the Economics Significance of the Public's Job Approval Rating of the President

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TEACHING POLITICAL ECONOMY: ON THE ECONOMICS SIGNIFICAMCE OF THE PUBLIC'S JOB APPROVAL RATING OF THE PRESIDENT

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This study empirically investigates the hypothesis that the lower the public's job approval rating of the U.S. President, the higher the degree of aggregate federal personal income tax evasion in the U.S. Using annual data on aggregate federal personal income tax evasion for the period 1960-2001 compiled by Feige, with 2001 being the most recent year for which these data are currently available, and allowing for such factors as federal income tax rates, IRS tax return audit rates, the tax-free municipal bond yield, the interest rate penalty on detected unreported income, public dissatisfaction with government officials (other than the U.S. President), and the Tax Reform Act of 1986, this study finds consistent empirical support for the hypothesis that income tax evasion is a decreasing function of the Presidential approval rating, i.e., that the lower (higher) the President's approval rating, the greater (lower) the degree of aggregate federal personal income tax evasion. Finally, use of two well-known alternative estimates of the aggregate degree of federal personal income tax evasion yields results generally consistent with these conclusions.

I. INTRODUCTION

In the U.S., income tax evasion is usually defined as to consist of taxable income that is either unreported or underreported to the IRS. Studies of income tax evasion behavior essentially fall into three categories. First, there are the principally theoretical models of tax evasion behavior, such as Allingham and Sandmo (1972), Falkinger (1988), Klepper, Nagin, and Spurr (1991), Das-Gupta (1994), Pestieau, Possen, and Slutsky (1994), and Caballe and Panades (1997). Second, there are a number of studies that either (a) use questionnaires or (b) undertake experiments, such as Spicer and Lundstedt (1976), Friedland (1982), Spicer and Thomas (1982), Baldry (1987), De Juan (1989), Thurman (1991), and Alm, Jackson, and McGee (1992). Third are those studies that use what is referred to as "official data," such as Tanzi (1982; 1983), Bawley (1982), Clotfelter (1983), Carson (1984), Erard and Feinstein (1994), Feige (1994), Cebula (2001; 2004), and Ali, Cecil, and Knoblett (2001).

In this literature, it is widely believed that the "degree of federal personal income tax evasion in the economy as a whole" (hereafter, "*DTE*") is positively affected by income tax rates (Tanzi (1982); Clotfelter (1983); Feige (1994)). Interestingly, Yaniv (1994) qualifies Clotfelter (1983) as "the most relevant study" with respect to the impact of income tax rates on tax evasion, whereas Cox (1984) and Slemrod (1985) question his findings. In any event, this perspective is simple: the higher the income tax rate, the greater the benefit (in terms of a reduced tax liability) from not reporting taxable income, *ceteris paribus*. It is also widely accepted that the *greater* the risk associated with underreporting or not reporting taxable income, the *less* the degree to which economic agents will choose either to not report or to underreport their taxable income (Friedland

(1982); Spicer and Thomas (1985); De Juan (1989); Errard and Feinstein (1994)).

From a different perspective, there exists a rich literature that explores a wide variety of issues that involve the U.S. Presidential approval rating, including Monroe (1984), Edwards (1991; 1998), Clarke and Stewart (1994), King (1999), Erikson, MacKuen, and Stimson (2000), Cohen (2003), Fox and Phillips (2003), and Canes-Wrone (2004). Interestingly, many of these studies find a link between Presidential approval on the one hand and economic performance or lack thereof on the other hand.

This study seeks to add to both the rich literature on income tax evasion and the rich literature on U.S. Presidential approval by investigating whether the degree of aggregate federal personal income tax evasion is influenced by the public's job approval rating of the U.S. President. In particular, this study attempts to provide insight as to whether the degree of personal income tax evasion rises (falls) when the public's approval rating of the President declines (rises). This hypothesis is predicated on the idea that the lower the approval rating, the greater the degree to which the public experiences a "secondary benefit/gain" from income tax evasion. The data reflecting the public's job approval rating of the President are obtained from surveys that ask the question "Do you approve or disapprove of the way [the President's name] is handling his job as President?"

In an effort to distinguish on the one hand between the public's job approval rating of the U.S. President *per* se and the public's dissatisfaction on the other hand with government officials *other than the President*, two of the estimates provided in this study include an alternative variable, one that consists of survey data reflecting the latter sentiments, i.e., the public's dissatisfaction with government officials (other than the President). The model is presented in Section II. Naturally, a variety of potential income-tax-evasion influencing factors are included in the model. Section III provides the formal empirical analysis, whereas Section IV provides concluding observations.

II. THE MODEL

In this study, the *relative* probability that the *representative* economic agent will *not* report his/her taxable income to the IRS is treated as an increasing function of the expected gross benefits to the agent of not reporting income, *eb*, and a decreasing function of the expected gross costs to the agent of not reporting income, *ec*. Thus, the ratio of the probability of not reporting income to the IRS, *pnr*, to the probability of reporting income to the IRS, *(1-pnr)*, is described for the representative economic agent by:

$$(1) \qquad pnr/(1\text{-}pnr) = f(eb, ec), f_{eb} > 0, f_{ec} < 0$$

Expressing probabilities in *relative* terms such as shown in equation (1) possesses the virtue that it thereby reflects the form of the tax evasion data, i.e., data where (as described below in Section III) the aggregate degree of federal personal income tax evasion (*DTE*) is expressed in such relative terms.

As already observed, the gross expected benefits from *not* reporting income to the IRS are hypothesized to be an increasing function of the federal personal income tax rate (Cagan (1958); Bawley (1982); Tanzi (1982); Clotfelter (1983); Feige (1994)). To reflect the federal personal

income tax rate, most previous studies using official data for the U.S. have adopted either of two alternative measures: an average effective federal personal income tax rate (*AEPT*) or the maximum marginal federal personal income tax rate (*MAXT*). In this study, the *AEPT* measure of the income tax rate is adopted because, as argued in Feige (1994), this tax rate is likely to be a more representative measure of the personal income tax rate for a larger portion of the taxpaying public than *MAXT* would be. Accordingly, it is hypothesized, *ceteris paribus*, that:

(2) $eb = g(AEPT),\ g_{AEPT} > 0$

Next, this study endeavors to allow for the potential impact of *legal tax avoi*dance on *illegal tax evasion*. To do this, we test the hypothesis by Cebula (2004, p. 419) that "…the higher the tax-free interest rate yield on high grade municipal bonds (*TF*) relative to the taxable interest rate yield on…high quality bonds or notes such as ten year U.S. Treasury notes (*TEN*), the greater the incentive to engage in legal tax avoidance and the lower the incentive to engage in tax evasion." Thus, it is expected that the greater the *TF/TEN* ratio, the lower the *eb*, *ceteris paribus*. Hence, (2) is now rewritten as:

(3) $eb = h(AEPT, TF/TEN),\ h_{AEPT} > 0,\ h_{TF/TEN} < 0$

The Tax Reform Act of 1986 (*TRA*) may have been perceived by at least some portion of the general public as an honest, good faith effort to reform, i.e., to simplify and increase the equity of the Internal Revenue Code. As Musgrave observed (1987, p. 59), "The Tax Reform Act of 1986 is the most sweeping reform since the early 1940s…" Indeed, the *TRA* did introduce a number of reforms, many of which are outlined in broad terms in Barth (1991), Barth and Brumbaugh (1992), Ott and Vegari (2003), and Sanger, Sirmans, and Turnbull (1990). For example, as observed in Ott and Vegari (2003, p. 279), "The Act introduced major cuts in the personal tax rate. When fully effective (1988) only two tax brackets set at 15 and 28 percent were to replace the 14 bracket tax schedule with rates in the range of 11 to 50 percent...[while it] broadened the tax base by reducing the itemized deduction." Musgrave (1987, p. 59) further observes that prior to the *TRA*, a slow erosion of the income tax base had been occurring. Musgrave (1987, p. 57) was particularly dismayed by the widening of tax loopholes and the emergence of high income tax shelters that had "…gained momentum in recent years and undermined the public's faith in the income tax. " In this vein, Barth (1991), Barth and Brumbaugh (1992), and Sanger, Sirmans, and Turnbull (1990) describe how the *TRA* decreased depreciation benefits from financial investments in residential as well as commercial real estate, established limitations on the tax deductibility of losses from "passive" investments that affected limited partnership syndications (including those involving real estate ventures), and terminated favorable capital gains treatment of real estate. Musgrave (1987, p. 59) also expressed concern that the "…compounding of the investment tax credit and accelerated depreciation diluted and distorted the base of the corporate income tax." Musgrave (1987, p. 59) asserted that the *TRA* "…reversed these trends, a major accomplishment that all reformers will welcome." As Barth (1991, pp. 45, 124) observes, among other things, under the *TRA* the 10 percent investment tax credit for the purchase of equipment was repealed, and the life of the investment was increased for depreciation purposes. Based on Musgrave's (1987) arguments, then, it is expected in the present study that taxpayers might well have favorably regarded the *TRA* and

been less resentful of the Internal Revenue Code than before, at least initially. Thus, it is hypothesized here that at the time the *TRA* was being enacted and becoming fully effective (1986-1988) and also received the greatest publicity, reduced taxpayer resentment of the federal income tax system/Internal Revenue Code *would/could*, at least *temporarily*, have resulted in a reduced degree of aggregate personal income tax evasion, *ceteris paribus*. The reason this reaction to the *TRA* might be only *temporary* is revealed in the words of Slemrod (1992, p. 45), who argues that it would take at least some time for taxpayers "…to learn about and adjust to the new law [the *TRA*]." Consequently, it is hypothesized here that, for the period when the *TRA* was first implemented, 1986, through the year the *TRA* became "fully effective," 1988 (Barth (1991); Barth and Brumbaugh (1992)), the *eb* was reduced. Accordingly, (3) above is replaced by (4):

(4) $eb = j(AEPT, TF/TEN, TRA), j_{AEPT} > 0, j_{TF/TEN} < 0, j_{TRA} < 0$

As will be shown in column (a) of Table 2 of this study, although this variable of and in itself generates a negative and statistically significant coefficient, exclusion of this binary variable from the estimations does *not* significantly alter the conclusions of this study. Furthermore, estimating with the TRA dummy variable so specified as to include years *after 1988* renders this variable statistically insignificant, a finding consistent with arguments in Slemrod (1992, p. 45), although the other findings in the model are not seriously affected by so specifying TRA. Accordingly, based our estimation results and the argument in Slemrod (1992, p. 45), it is argued here that TRA as specified above is the most useful form of this variable.

Finally, there is the issue of the public's job approval rating of the U.S. President *per se* (*APPROV*). It is argued here that the higher the public's approval rating of the President's job performance, the greater the degree to which there is satisfaction with the President's actions and policies. The latter can be interpreted, at least to some degree, as implying less public resentment towards or greater approval of his various tax and/or spending policies. Indeed, Cebula (2007, p. 314) has recently found that "…federal income-tax-related issues *do* strongly influence the public approval rating of the [U.S.] President". Conversely, the lower the public's approval rating of the President's job performance, the greater the degree to which the public is likely to be dissatisfied with the President's actions and policies. In turn, it can be reasonably argued that the latter can be interpreted, to at least some extent, as implying greater resentment of or less public support for his various tax and/or spending policies. Stated somewhat differently, the lower the level of *APPROV*, the greater the *subjective benefits* ("secondary gains") from personal income tax evasion, whereas the higher the level of *APPROV*, the lower the *subjective benefits* (secondary gains) of personal income tax evasion. Based on this symmetrical argument, it is hypothesized that the greater the public's approval rating of the President, the lower the *eb*, *ceteris paribus*, so that (4) becomes:

(5) $eb = k(AEPT, TF/TEN, TRA, APPROV), k_{AEPT} > 0, k_{TF/TEN} < 0, k_{TRA} < 0, k_{APPROV} < 0$

The data set used to measure the public's job approval rating of the U.S. President involves responses to the following survey question: "Do you approve or disapprove of the way [the U.S. President's name] is handling his job as President?" Of course, one could argue that the public's propensity to engage in income tax evasion might be related to its dissatisfaction with government in general and not to its job approval rating of the President *per se* and that the *APPROV* variable

merely reflects that more generalized dissatisfaction with government or government officials. In point of fact, evidence that this is *not* the case is provided below in two separate estimates, equations (14) and (14a).

The expected gross costs of not reporting income to the IRS are hypothesized to be an increasing function of the expected risks/costs thereof (Pestieau, Possen, and Slutsky (1994); Erard and Feinstein (1994); Caballe and Panades (1997)). In this study, to the representative economic agent, the expected risks/costs from not reporting or from underreporting taxable income to the IRS are enhanced by an increase in *AUDIT*, the percentage of filed federal personal income tax returns that is formally audited by IRS examiners/personnel, *ceteris paribus*. Indeed, the experience of an IRS tax audit could imply non-pecuniary ("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. In addition to *AUDIT*, it is hypothesized that the expected risks/costs of tax evasion also include the magnitude of the IRS imposed penalties (*PENALTY*) should one's tax evasion activities be successfully detected by the IRS. To reflect this penalty, this study adopts the average interest rate charged by the IRS in each year on detected unreported income. Clearly, the greater the value of *PENALTY*, *ceteris paribus*, the greater the *ec*. Thus, we have:

(6) $ec = j(AUDIT, PENALTY), j_{AUDIT} > 0, j_{PENALTY} > 0$

Substituting from (5) and (6) into (1) yields:

(7) $pnr/(1\text{-}pnr) = b(AEPT, TF/TEN, TRA, APPROV, AUDIT, PENALTY)$,
$b_{AEPT} > 0, b_{TFTEN} < 0, b_{TRA} < 0, b_{APPROV} < 0, b_{AUDIT} < 0, b_{PENALTY} < 0$

Let *AGI* represent the *actual total value of the aggregate federal adjusted gross income* in the economy, i.e., *AGI=UAGI+RAGI*, where *UAGI* is the dollar size of the *unreported aggregate federal adjusted gross income* in the economy, and *RAGI* is the dollar size of the *reported aggregate federal adjusted gross income* in the economy. It reasonably follows overall that:

(8) $UAGI = (pnr)*AGI$
and

(9) $RAGI = (1\text{-}pnr)*AGI$

It then follows that:

(10) $UAGI/RAGI = (pnr)*AGI/(1\text{-}pnr)*AGI = (pnr)/(1\text{-}pnr)$

From (7) and (10), substitution for $pnr/(1\text{-}pnr)$ in (1) yields:

(11) $UAGI/RAGI = b(AEPT, TF/TEN, TRA, APPROV, AUDIT, PENALTY)$,
$b_{AEPT} > 0, b_{TF/TEN} < 0, b_{TRA} < 0, b_{APPROV} < 0, b_{AUDIT} < 0, b_{PENALTY} < 0$

III. EMPIRICAL ANALYSIS

Based on the framework provided in (11) above, the following reduced-form equation is to be estimated:

(12) $(UAGI/RAGI)_t = a_0 + a_1\, AEPT_{t-1} + a_2\, (TF/TEN)_{t-1} + a_3\, TRA_t + a_4\, APPROV_{t-1} + a_5\, AUDIT_{t-1} + a_6\, PENALTY_{t-1} + u$

where:

$(UAGI/RAGI)_t$ = the ratio of the aggregate *unreported* federal adjusted gross income in year t to the aggregate *reported* federal adjusted gross income in year *t*, expressed as a percent;

a_0 = constant term;

$AEPT_{t-1}$ = the average effective federal personal income tax rate in year *t-1*, expressed as a percent;

$(TF/TEN)_{t-1}$ = the ratio for year *t-1* of the average annual tax-free interest rate yield on high grade municipal bonds to the average annual taxable interest rate yield on ten-year U.S. Treasury notes, expressed as a percent;

TRA_t= a binary (dummy) variable for the years 1986 through 1988, when the Tax Reform Act of 1986 was initially implemented and became fully effective:TRA_t=1 for the years 1986, 1987, and 1988, and TRA_t =0 otherwise;

$APPROV_{t-1}$ = the public's job approval rating of the President in year in year *t-1*: values for $APPROV_{t-1}$ lie between 0 and 100;

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

$PENALTY_{t-1}$ = the average percentage interest rate used by the IRS in year *t-1* to assess penalties on detected unreported income; and

u = stochastic error term.

The study period runs from 1960 through 2001, reflecting availability of the tax evasion data. The data are annual. The data for *AEPT*, *AUDIT*, and *PENALTY* were obtained from the IRS (1957-1997; 2003). The *TRA* variable is a dummy variable; the Tax Reform Act of 1986 was actually signed into law by President Reagan in October of 1986. The data for the variable *TF/TEN* were obtained from the Council of Economic Advisors (2008, Table B-73). The survey data for the variable *APPROV* were obtained from the University of California at Santa Barbara (2008) website http://www.presidency.ucsb.edu/data/popularity.php?pres=&sort=time&direct=ASC&Submit=DISPLAY. The persons included in the survey were asked the question "Do you approve or disapprove of the way [the President's name] is handling his job as U.S. President?" Observe the focus expressly on the assessment of the U.S. President's job performance.

The first series adopted to measure income tax evasion, in this case represented by the variable *UAGI/RAGI*, were obtained from Feige (1989; 1994; 1996; 1997), extended back through 1960. Based on the General Currency Ratio (*GCR*) model, Feige has estimated the ratio of aggregate *unreported* adjusted gross income to aggregate *reported* adjusted gross income, using an IRS estimate for this ratio as the baseline in his computations. The mean value for variable (*UAGI/RAGI*) for the study period was 20.28, with a standard deviation of 5.83.

The *P-P* (Phillips-Perron) and *ADF* (Augmented Dickey-Fuller) unit root tests indicate that the variables *UAGI/RAGI*, *AEPT*, and *AUDIT* are stationary only in first differences. On the other hand, the variables *TF/TEN*, *APPROV*, and *PENALTY* are stationary in levels. Accordingly, in the

estimations, the variables *UAGI/RAGI*, *AEPT*, and *AUDIT* are expressed in first differences form.

The *OLS* estimation of equation (12), adopting the Newey-West heteroskedasticity correction, is given by:

$$(13) \quad z(UAGI/RAGI)_t = +11.2 + 0.115\ zAEPT_{t-1} - 6.92\ (TF/TEN)_{t-1} - 2.231\ TRA_t$$
$$(+2.19) \qquad (-2.24) \qquad\qquad (-4.22)$$

$$- 0.066\ APPROV_{t-1} - 0.71\ zAUDIT_{t-1} - 0.21\ PENALTY_{t-1}$$
$$(-2.45) \qquad\qquad (-2.28) \qquad\qquad (-2.58)$$

$$R^2 = 0.58,\ \text{adj}R^2 = 0.53,\ F = 3.42,\ DW = 1.79,\ Rho = 0.09$$

where terms in parentheses are *t-values* and *z* is the first-differences operator. In equation (13), the estimated coefficients on all six of the explanatory variables exhibit the hypothesized signs, with all six being statistically significant the five percent level or beyond. The coefficient of determination is 0.58, so that the model explains nearly three-fifths of the variation in the dependent variable. The *F*-statistic is significant at the one percent level. Finally, there should be no concern regarding autocorrelation.

The estimated coefficient on the *AEPT* variable is positive and significant at the five percent level. Thus, the higher the average effective federal personal income tax rate, the greater the degree of federal income tax evasion by households, presumably because a higher income tax rate increases the incentive to evade taxes. This finding is consistent with the conventional wisdom and with several previous empirical studies, e.g., Tanzi (1982), Clotfelder (1983), Feige (1994), and Cebula (1997). The estimated coefficient on the *TF/TEN* variable is negative and significant at the three percent level, affirming the hypothesis tested in Cebula (2004) that this form of *legal tax avoidance* does in fact act to reduce the degree of *illegal tax evasion*. The estimated coefficient on the Tax Reform Act of 1986 dummy variable is negative, as hypothesized (Musgrave, 1987), and statistically significant at the one percent level, providing evidence that taxpayers *may* have regarded the Tax Reform Act of 1986 as a genuine, honest effort to reform the inequities of and diminish the complexities (compliance costs) of the existing Internal Revenue Code. Alternatively, as implied by Slemrod (1992, p. 45), the observed drop in personal federal income tax evasion for this *brief* period may simply have reflected the time frame required by taxpayers to learn about and adjust to this allegedly "sweepingly reformed" (Musgrave, 1987) new version of the Internal Revenue Code. Furthermore, as observed earlier, the coefficient on the TRA dummy loses its statistical significance once years beyond 1988 are included in its specification. This, TRA, as specified here, may be regarded as a "control variable." The estimated coefficients on the variables *AUDIT* and *PENALTY* are both negative (as hypothesized) and statistically significant at the three and two percent levels, respectively. These two findings would suggest that taxpayers are discouraged from tax evasion behavior by increased prospects of detection (as represented by variable *AUDIT*) and by increased costs of tax evasion should such tax evasion behavior be detected (as reflected in the variable *PENALTY*). Finally, there is the central thesis of this study: "Does a lower (higher) job approval rating of the President by the U.S. public act to increase (decrease) the degree of aggregate federal personal income tax evasion?" As shown in equation (13), the estimated coefficient on variable *APPROV* is negative (as hypothesized) and statistically

significant at the 2.5 percent level. Thus, the findings shown in equation (13) appear to provide strong empirical support for the central hypothesis of this study, namely that the higher (lower) the public's job approval rating of the U.S. President, the lower (higher) the aggregate degree of federal personal income tax evasion (in the U.S.).

One reasonable way to test the robustness of these results and in particular the finding for the variable *APPROV* is to integrate into the system a separate and different measure of the public's dissatisfaction/satisfaction with government, one that (at least in theory) reflects different sentiments from those impounded in the *APPROV* variable. This suggestion was first made by Feige (1994), who hypothesized that the greater the public's dissatisfaction with *government officials per se* (*as opposed to* the *U.S. President per se*), the greater might be the subjective benefits of personal federal income taxation. To test this hypothesis, Feige (1994) adopts the variable *DIS*, which represents the "dissatisfaction index." This index is constructed as an equally *weighted average* of three normalized indices reflecting answers to the University of Michigan's Institute for Social Research annual surveys concerning (i) whether government officials (exclusive of the U.S. President) can be trusted (to honor obligations to the public), (ii) whether said government officials (exclusive of the President) are dishonest, and (iii) whether said government officials (exclusive of the President) waste tax dollars. Values for this index of *dissatisfaction* lie within a range of (-1.5), which corresponds to least dissatisfied, to (+1.5), which corresponds to most dissatisfied. Thus, the algebraic value of *DIS* is higher as the public becomes more dissatisfied with government officials. As in Feige (1994), it is hypothesized here that the higher the value of *DIS*, the more benefit (utility) people derive from avoiding taxes through the underreporting of income to the IRS, i.e., the greater the subjective benefits of income tax evasion, *ceteris paribus*. Data were obtained from the University of Michigan (1960-1997) and Cebula, Koch, and Paul (2003). Over the study period, the *P-P* and *ADF* unit root tests reveal that *DIS* is stationary in first differences. Therefore, it is expressed in first differences form in the estimate. Introduction of this *de facto* control variable should enable us to determine whether or not the Presidential approval rating variable (*APPROV*) merely is capturing the broader dissatisfaction (or satisfaction) that the public feels towards to government officials in general as opposed to the U.S President.

Integrating this additional variable into equation (12) and estimating by *OLS* using the Newey-West heteroskedasticity correction yields:

$$(14)\quad z(UAGI/RAGI)_t = 10.12 + 0.131\ zAEPT_{t-1} - 6.4\ (TF/TEN)_{t-1} - 2.01\ TRA_t$$
$$\qquad\qquad\qquad\qquad\qquad\quad (+2.17) \qquad\quad (-2.21) \qquad\quad (-3.82)$$

$$- 0.065\ APPROV_{t-1} - 0.71\ zAUDIT_{t-1} - 0.23\ PENALTY_{t-1} + 0.99\ zDIS_{t-1}$$
$$(-2.39) \qquad (-2.26) \qquad (-2.74) \qquad (+1.04)$$

$R^2 = 0.59$, adj $R^2 = 0.53$, $F = 3.22$, $DW = 1.80$, $Rho = 0.09$

As shown in estimate (14), the estimated coefficient on the *DIS* variable, although positive, is not statistically significant. This finding of an inability to reject H_0 with respect to the *DIS* variable is entirely consistent with the *empirical finding* in Feige (1994). As for the remaining results in estimate (14), they are entirely consistent with those in estimate (13) above. Especially noteworthy is the fact that the coefficient on the variable APPROV, despite the presence of the *DIS*

variable, remains *negative* (as hypothesized) and is statistically significant at the 2.5 percent level. Thus, the evidence points again to a conclusion that the greater (lesser) the public's job approval rating of the U.S. President *per se*, the lower (higher) the degree of aggregate federal personal income tax evasion.

Interestingly, *substitution* of the dissatisfaction variable for the Presidential Approval variable (*APPROV*) yields the following results:

$$(14a)\quad z(UAGI/RAGI)_t = 7.2 + 0.15\ zAEPT_{t-1} - 7.1\ (TF/TEN)_{t-1} - 2.55\ TRA_t$$
$$(+2.65)\qquad (-2.33)\quad (-4.12)$$

$$- 0.52\ zAUDIT_{t-1} - 0.13\ PENALTY_{t-1} + 1.02\ zDIS_{t-1}$$
$$(-0.99)\qquad (-1.62)\qquad (+0.99)$$

$$R^2 = 0.46,\ \text{adj}R^2 = 0.41,\ F = 1.76,\ DW = 1.73,\ Rho = 0.13$$

In this case, substitution of the dissatisfaction index for the Presidential job approval rating generates some very different conclusions. Although the *AEPT*, *TF/TEN*, and *TRA* variables retain their statistical significance, the *AUDIT* and *PENALTY* variables lose theirs. The R^2 and adjusted R^2 values are noticeably lower, and the *F*-statistic is not statistically significant at even the ten percent level. Perhaps even more relevant is the finding that the *DIS* variable is not statistically significant at even the ten percent level. The latter result, which, as already observed, is consistent with the *empirical* finding in Feige (1994), demonstrates that the *DIS* variable and *APPROV* variable appear to exercise very different impacts on income tax evasion behavior. Indeed, the *APPROV* variable exercises a negative and statistically significant influence over the degree of federal personal income tax evasion, whereas the dissatisfaction index, which does *not* involve the public's approval rating of the U.S. President *per se*, exercises no statistically significant impact on that tax evasion.

To further test the robustness of the results shown in equation (13), consider Table 1, where three alternative versions of the basic model are provided. In column (a), the binary variable adopted to reflect the Tax Reform Act of 1986 was dropped from equation (12) in the event that the results might be sensitive to this dummy variable as specified. As shown, the non-*TRA* results in column (a) of the Table are entirely compatible with those in equation (13), so that the basic results do *not* appear *sensitive* to the inclusion or exclusion of the *TRA* dummy. According to column (a) of Table 1, the relative degree of federal personal income tax evasion (as measured) is an increasing function of the average tax rate while being a decreasing function of the ratio of the interest rate yield on high grade tax free municipals to the taxable interest rate yield on ten year Treasury notes, the IRS audit rate, and the penalty interest rate adopted by the IRS to be assessed on detected unreported income. In addition, the estimated coefficient on the *APPROV* variable is negative and statistically significant at the one percent level, providing further support for the hypothesis that the lower (higher) the public's job approval rating of the President, the greater (lower) the degree of federal personal income tax evasion.

Next, consider column (b) of Table 1. In this column, the model in equation (12) is estimated using a different data set for the tax evasion variable. Namely, in this estimate, we adopt the Tanzi (1982; 1983) estimate of aggregate federal personal income tax evasion extended through 2001. In this case, the tax evasion variable, which was also derived using a *GCR* model, is

represented by the aggregate level of federal personal income tax evasion expressed as a percent of the *GDP*. Over the 1960-2001 study period, the mean of this measure of aggregate federal personal income tax evasion was 4.9, and the standard deviation was 0.58. Like the Feige measure of income tax evasion, for the study period, the Tanzi measure is also stationary only in first differences form (according to the *P-P* and *ADF* tests). As shown in Table 1, the results in column (b) are effectively consistent with those in equation (13). In particular, all six of the estimated coefficients exhibit the expected signs and are statistically significant at the five percent level or beyond. Of greatest interest here is the coefficient on the *APPROV* variable, which is negative and statistically significant at the one percent level. Thus, the evidence once again reveals that federal personal income tax evasion in the U.S. varies inversely with the public's job rating of the U.S. President: the lower (higher) the President's approval rating, the greater (lower) the aggregate degree of federal personal income tax evasion.

Finally, consider column (c) of Table 1. In this case, the measure of tax evasion is based on the *AGI-Gap* Approach, as estimated by Ledbetter (2004, Table 5). The approach in Ledbetter (2004) is one that computes the discrepancy between the *AGI* reported to the IRS and an independent estimate of the aggregate *AGI* derived from the National Income and Product Accounts of aggregate personal income. In particular, "…the relative *AGI* gap is the *AGI* gap as a percentage of the BEA [Bureau of Economic Analysis]-derived *AGI*" (Ledbetter, 2004, p. 14). This series is not sensitive to the restrictive kinds of assumptions found in currency ratio models. In any event, for the 1960-2001 study period, the average ratio of tax evasion as a percent is 10.98, with a standard deviation of 1.32. Based upon the *P-P* and *ADF* tests, this measure of the tax evasion variable is stationary only in first differences. Experimentation revealed that this series was quite sensitive to the presence of the *TRA* dummy; consequently, the model estimated in column (a) of Table 1 was adopted in this case for estimation and reporting purposes. As shown in column (c), the coefficient on the Presidential approval variable is significant at the 2.5 percent level, lending yet further support for the central hypothesis being investigated in this study.

IV. CONCLUSION

This study investigates the hypothesis that the lower (higher) the public's job approval rating of the U.S. President, the higher (lower) the aggregate degree of federal personal income tax evasion in the U.S. The study period runs from 1960 through 2001. On the one hand, the hypothesis implies that there is a greater "secondary gain" to federal personal income tax evasion when the public is giving a lower approval rating to the U.S. President's job performance; this secondary gain increases the motivation for households to evade federal personal income tax liabilities. On the other hand, this secondary gain from income tax evasion diminishes when the public gives the President a higher job approval rating; the latter then diminishes the motivation to actually evade federal personal income taxes. This study finds consistent empirical support for this hypothesis, namely, that in the U.S. the aggregate degree of federal personal income tax evasion is a decreasing function of the public's job approval rating of the U.S. President. In closing, it is arguably *possible* to *some degree* to interpret the aggregate degree of federal personal income tax evasion in the U.S. as a form of implicit "within-term" voting, i.e., voting by (non) taxing behavior may be occurring. Naturally, formal investigation of such an interpretation would require the

development and testing of an appropriately specified model of voting behavior, one which would expand the interpretation of the "rational voter model."

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Table 1. Three Alternative Estimates*

Variable\Estimation	(a)	(b)	(c)
a_0	+12.2	+1.5	+1.6
$zAEPT_{t-1}$	+0.12	+0.11	+0.09
	(+2.18)	(+2.04)	(+2.56)

$(TF/TEN)_{t-1}$	-7.25 (-2.48)	-2.08 (-2.79)	-2.13 (-0.69)
TRA_t	-------	-0.181 (-3.05)	-------
$APPROV_{t-1}$	-0.077 (-2.68)	-0.052 (-2.54)	-0.044 (-2.35)
$zAUDIT_{t-1}$	-0.803 (-2.70)	-0.697 (-3.95)	-0.641 (-2.98)
$PENALTY_{t-1}$	-0.27 (-3.15)	-0.23 (-2.20)	-0.11 (-1.99)
R^2	0.54	0.53	0.55
AdjR^2	0.46	0.47	0.45
F	3.40	2.93	4.89
DW	1.80	2.16	1.80
Rho	0.09	-0.08	0.09

*In all estimates, the Newey-West heteroskedasticity correction was adopted. Terms in parentheses are t-values.