

Trends as Changes in Variance: The Case of Tax Noncompliance

Kim M. Bloomquist, Internal Revenue Service

Presented at the 2003 IRS Research Conference, June 2003

In a recent survey, Schneider and Enste (2000) report that the “shadow” economies of Organization for Economic Cooperation and Development (OECD) nations grew from 11.9 percent of Gross Domestic Product (GDP) in 1989-90 to 16.9 percent of GDP in 1996-97.¹ After reviewing a number of factors that could account for this trend, the authors conclude, “an increasing burden of taxation and Social Security payments, combined with rising State regulatory activities and labor market restrictions (e.g., forced reduction in working hours), are the major driving forces for the size and growth of the shadow economy.” They reason that higher taxes and increased regulation of business create an incentive to work in the shadow economy where earnings may go unreported and tax evasion is difficult to detect. In a recent update, Schneider (2002) reaffirms his earlier view but adds the following caveat, “major tax rate reductions will not lead to a substantial decrease of the shadow economy. They will only be able to stabilize the size of the shadow economy and avoid a further increase.” The problem, he says, is that once people are engaged in the shadow economy, it is difficult to get them to stop.

In an analysis of tax compliance trends among U.S. taxpayers, Graetz (1999) reaches a similar conclusion: “Voluntary [tax] compliance has declined. Of this, there can be no doubt.” However, Graetz is scornful of the notion that higher tax burden, per se, contributed to this development. He says, “The Pollyannaish notion that compliance problems will disappear if we lower tax rates ... does not withstand even cursory analysis.” Instead, Graetz sees taxpayers’ mounting dissatisfaction with the income tax as a reaction to the tax code’s increasing complexity. He recommends scrapping the existing income tax for families making less than \$100,000 and replacing it with a consumption tax that would exempt such families from filing a tax return. If growing tax law complexity induces taxpayers to evade more, Graetz’ tax simplification plan should significantly improve voluntary compliance.

However, in a recent test of this hypothesis, Forest and Sheffrin (2002) fail to detect a relationship between tax law complexity and a perception of unfairness. They conclude that simplifying the tax code, while an otherwise laudable goal, would not automatically improve compliance.

What lessons can tax administrators draw from this debate? Assuming evasion activity has increased in recent years, experts seem to differ in their views as to what is causing this trend.² If neither increasing complexity nor a rising tax and regulatory burden can adequately explain the growth in noncompliant behavior, what else could account for this phenomenon?

Alm (2000), citing the work of Gould (1996), points out that “trends” in population characteristics are not necessarily indicators of changes in the level of individual behavior but may indicate a change in environmental conditions that can alter the “success” of existing behavior. Gould (1996) uses this approach to explain the disappearance of 0.400 hitting in major league baseball, which he attributes to improvements in defensive play rather than a deterioration of batting skills among modern-era players. The last major league baseball player to hit 0.400 or better was Ted Williams in 1941. Gould argues that gradual improvements in fielding and pitching (e.g., better gloves, greater use of relief pitching) have reduced hitting opportunities for the best players, even as batting skills have improved overall. This combination of factors (overall improvement of both hitting and fielding) has caused the variance to gradually shrink around a constant population mean batting average making the 0.400 mark an increasingly rare statistical event.

A similar phenomenon, only in reverse, could explain the recent trend of rising tax noncompliance. For example, within the economics profession, the consensus view is that evasion propensity varies inversely with transaction visibility (Roth, Scholz, and Witte, 1989). Analysis of randomly audited tax returns finds higher rates of voluntary reporting compliance for income subject to third-party reporting and withholding than income not subject to information reporting (Internal Revenue Service, 1996). Therefore, other things being equal, something that causes the share of income subject to information reporting to decline could generate a trend of rising noncompliance.

The purpose of this paper is to show that the presumed rise in evasion activity may be due, at least in part, to a shift in the distribution of taxpayer income away from more visible to less visible sources. First, we briefly review previous research on the relationship between transaction visibility and evasion and demonstrate how a trend of rising noncompliance could result from a decline in transaction visibility that appears to have occurred in recent years. Next, we examine the causes for the decline in transaction visibility and link this phenomenon to the broader trend of rising income inequality. Following this, we present some preliminary findings that show a correlation between income inequality and size of the shadow economy for a sample of developed and developing nations. Lastly, we summarize key points.

Transaction Visibility and Reporting Noncompliance

One of the few generally accepted facts in the literature on tax compliance economics is the existence of a positive relationship between transaction visibility and reporting compliance. Over the years, various Government and academic studies have affirmed this relationship (Klepper and Nagin, 1989; Long and Swingden, 1990; Andreoni, Erard, and Feinstein, 1998). Random taxpayer audits conducted by the Internal Revenue Service (IRS) have consistently shown

higher compliance rates among income items subject to third-party information reporting and withholding (i.e., matchable) versus nonmatchable sources of income (Christian, 1994). In the 1988 Taxpayer Compliance Measurement Program (TCMP) study, the average weighted net misreporting percentage of reported income was 1.8 percent for matchable income and 22.6 percent for nonmatchable income (Internal Revenue Service, 1996).³ Therefore, ceteris paribus, we would predict a positive correlation between the evasion rate and share of nonmatchable income.

Table 1 shows the trend in matchable and nonmatchable sources of income between 1980 and 2000. In 1980, 91.3 percent of total reported taxpayer income was matchable. By 2000, this percentage had fallen nearly 10 percentage points to 81.6 percent. The principal factor responsible for this trend was the faster than average growth in the nonmatchable income components of taxable net capital gains and partnership and small business corporation (SBC) net income.

Holding constant the 1988 TCMP misreporting rates for matchable and nonmatchable income, it is estimated that, between 1980 and 2000, overall income underreporting rose from 3.6 percent to 5.6 percent of reported income due solely to the increase in the percentage of nonmatchable income (Table 1). This trend of rising noncompliance is not driven by a change in taxpayer behavior but is simply the result of improved success from existing behavior. Therefore, if tax noncompliance is increasing, it is possible that this trend is unrelated to taxpayers' higher tax burdens or tax law complexity. Instead, taxpayers simply may be enjoying greater success at evasion due to reduced transactions visibility.

Causes for the Decline in Transaction Visibility

What has caused the share of nonmatchable income to increase during the last two decades? Clearly, the stock market bubble of the late 1990's contributed significantly to the explosive growth in the value of financial assets. Between 1995 and 2000, the share of taxpayer reported adjusted gross income (AGI) from net capital gains jumped from 4 percent to 9½ percent. However, even before 1995, the share of matchable income had already experienced a steady decline dropping more than 4 percentage points between 1980 and 1995 (Table 1). Much of the erosion in the share of matchable income during this period was due to the growth in small business income that rose from 5.7 percent to 8.1 percent of reported AGI.⁴

Table 1. Growth of Matchable and Nonmatchable Components of Taxpayer Income and Estimated Underreporting Rate: 1980-2000

(\$ Billions)					
Income Component	1980	1985	1990	1995	2000
Total	\$1,705.4	\$2,542.8	\$3,590.6	\$4,404.0	\$6,628.1
Matchable	\$1,557.5	\$2,308.6	\$3,156.5	\$3,829.8	\$5,408.4
Wage Income	\$1,349.8	\$1,928.2	\$2,599.4	\$3,201.5	\$4,456.2
Interest Income	\$102.0	\$182.1	\$227.1	\$154.8	\$199.3
Dividends	\$38.8	\$55.0	\$80.2	\$94.6	\$147.0
State Tax Refunds	\$3.6	\$8.6	\$10.2	\$12.2	\$18.3
Taxable IRAs, Pensions & Annuities	\$43.3	\$95.1	\$176.9	\$258.4	\$424.8
Unemployment Compensation	\$2.1	\$6.4	\$15.5	\$19.3	\$16.9
Rents & Royalties (Net Income)*	\$17.9	\$23.6	\$32.5	\$43.3	\$55.9
Taxable Social Security Benefits	#N/A	\$9.6	\$14.7	\$45.7	\$90.0
Nonmatchable	\$147.9	\$234.2	\$434.1	\$574.2	\$1,219.7
Alimony Income*	\$1.4	\$2.9	\$3.9	\$4.3	\$6.2
Taxable Net Capital Gains*	\$32.7	\$66.0	\$122.7	\$176.5	\$628.5
Other Income	\$6.8	\$11.5	\$22.4	\$27.0	\$46.7
Nonfarm Proprietor Net Income	\$67.0	\$98.8	\$161.7	\$191.8	\$244.6
Farm Net Income	\$9.9	\$6.5	\$11.4	\$8.2	\$8.3
Partnership & SBC Net Income*	\$30.1	\$48.5	\$112.0	\$166.4	\$285.4
Percentage Matchable	91.3%	90.8%	87.9%	87.0%	81.6%
Estimated Underreporting Rate	3.58%	3.69%	4.29%	4.49%	5.60%

Source: Tax Year 2000 data from Campbell and Parisi (2002); prior tax year data from SOI Publication 1304, various issues.

Note: Estimated underreporting rate assumes 1.8% misreporting of matchable and 22.6% misreporting of nonmatchable income.

*Contains both matchable and nonmatchable income.

The secular trend of increasing nonmatchable income appears to be related to the larger phenomenon of widening income inequality. According to the U.S. Bureau of the Census, the share of total income (excluding capital gains) going to the top one fifth of families rose from 41.4 percent in 1980 to 47.7 percent in 2000.⁵ Another source, the IRS's Statistics of Income (SOI), indicates the share of AGI (including capital gains) of the top 5 percent of taxpayers with highest reported incomes rose from 24.1 percent in 1986 to 35.3 percent in 2000.⁶

High-income households typically receive a larger percentage of AGI in the form of nonmatchable income for the simple reason that most sources of nonmatchable income are investment-related (e.g., net capital gains, partnership income). However, as the distribution of income has shifted to the wealthiest top 5 percent of households in recent years, this group's share of nonmatchable income has increased even faster. Table 2 shows that, between 1980 and 2000, the average annual rate of growth (AAR) for nonmatchable income was 9.2 percent (inflation-adjusted dollars) for the top 5 percent of taxpayers with the highest reported AGI versus 4.2 percent for the bottom 95 percent of taxpayers. Moreover, while the share of nonmatchable income grew for both groups, the top 5 percent of taxpayers saw their nonmatchable income grow from 19.1 percent of total AGI in 1980 to 37.9 percent in 2000, nearly doubling in two decades.

Table 2. Growth in Matchable and Nonmatchable Income For Top 5 Percent and Bottom 95 Percent of Taxpayers: Tax Years 1980, 1990 and 2000
(Billion \$2000)

Taxpayer AGI Category	1980	1990	2000	AAR
All Taxpayers				
Total AGI	\$3,564.0	\$4,730.7	\$6,628.1	3.2%
Matchable AGI	\$3,254.9	\$4,158.8	\$5,408.4	2.6%
Nonmatchable AGI	\$309.1	\$571.9	\$1,219.7	7.1%
% Nonmatchable AGI	8.7%	12.1%	18.4%	
Top 5% Taxpayers				
Total AGI	\$761.3	\$1,305.8	\$2,239.9	5.5%
Matchable AGI	\$616.1	\$961.7	\$1,391.7	4.2%
Nonmatchable AGI	\$145.2	\$344.0	\$848.2	9.2%
% Nonmatchable AGI	19.1%	26.3%	37.9%	
Bottom 95% Taxpayers				
Total AGI	\$2,802.6	\$3,424.9	\$4,388.2	2.3%
Matchable AGI	\$2,638.7	\$3,197.0	\$4,016.7	2.1%
Nonmatchable AGI	\$163.9	\$227.9	\$371.5	4.2%
% Nonmatchable AGI	5.8%	6.7%	8.5%	

Source: SOI Publication 1304 for 1980 and 1990; Campbell and Parisi, 2002. CPI-U deflator used to adjust for inflation.

Tax Noncompliance and Income Inequality: Some Preliminary Evidence

This section presents some preliminary evidence for a relationship between income inequality and tax noncompliance. Table 3 contains data for a group of 23 developed and developing countries. Column two of Table 3 is the estimated size of the shadow economy as a percent of GDP from Schneider and Enste (2000). Their measure based on the physical input method is used since it best applies to a cross-section of countries in various stages of development. The third column of Table 3 contains country-specific Gini Coefficients from a World Bank study by Deininger and Squire (1996). All of the Gini Coefficients are income-based, reflect conditions in 1989-1990 to correspond with the shadow economy estimate, and represent the highest quality measure available (rating of "accept"). Only those countries that met all three conditions are included in Table 3. Finally, the last column of Table 3 displays total tax revenue as a percentage of GDP in 1990 as reported by the United Nations. This measure represents the relative tax burden imposed by the central government in each country. No international measure of tax system complexity was available for use in this study.

Table 3. Selected Data for 23 Developed and Developing Countries

Country	Size of Shadow Economy (as % of GDP)		Total Tax Revenue in 1990 (as % of GDP)
	Physical Input Method	Gini	
	Average 1989-90	Coefficient	
Australia	15.3	41.72	24.06
Brazil	29.0	59.60	19.11
Bulgaria	26.1	22.61	34.51
Canada	11.7	27.56	18.24
Chile	37.0	57.88	16.26
Costa Rica	34.0	46.07	20.81
Guatemala	61.0	59.06	6.87
Hungary	25.1	23.34	44.71
Italy	19.6	32.74	37.24
Japan	13.2	35.00	13.62
Malaysia	39.0	48.35	19.63
Mexico	49.0	54.98	17.72
Netherlands	13.4	29.60	42.84
Panama	40.0	56.47	17.72
Poland	27.2	26.48	35.13
Portugal	16.8	36.76	28.37
Rumania	20.9	23.38	30.93
Singapore	13.0	39.00	14.30
Sweden	11.0	32.52	37.19
Thailand	71.0	48.80	17.72
UK	13.1	32.30	33.45
USA	10.5	37.80	18.33
Venezuela	30.0	48.96	18.41

Source: Shadow Economy--Schneider and Enste (2000); Gini Coefficients--Deininger and Squire (1996); Total Tax Revenue as a percentage of GDP--United Nations Online Network in Public Administration and Finance (<http://unpan1.un.org/intrdoc/groups/public/documents/un/un-000028.pdf>)

An ordinary least squares regression model was estimated, using the data in Table 3. The estimated equation is shown below (t-statistics in parentheses).

$$[1] \text{ Shadow} = -12.308 + 0.921\text{Gini} + 0.108\text{Tax2GDP} \quad \text{adj } R^2 = 0.357 \quad F = 7.098$$

$$\quad \quad \quad (-0.564) \quad (2.759) \quad (0.271)$$

Both coefficients have the correct sign, but only the coefficient on the inequality measure is statistically significant ($p=0.012$).⁷ These results support the hypothesis that income inequality is positively related to the propensity to evade, perhaps due to the reduced visibility of transactions. Two other studies (Fajnzylber, Lederman, and Loayza, 1998 and Ehrlich, 1973) also found a positive correlation between income inequality and the incidence of crime on personal property, which they attribute to a lack of economic opportunity. Of course, an analysis based on a sample of nations with such a broad diversity of tax regimes and only indirect measures of noncompliance means these findings must be treated as preliminary. Nevertheless, the empirical results appear consistent with

the consensus view of a positive correlation between transaction visibility and tax compliance.

Conclusion

Recent research by Graetz (1999) and Schneider and Enste (2000) concludes that global tax evasion is on the rise. However, the authors differ in their assessments as to what is causing this trend. Schneider and Enste cite a rising tax and regulatory burden as the reason for an expanding shadow economy among OECD countries. Graetz sees the growing complexity of Federal income tax laws as the driving factor behind increased noncompliance in the U.S. This paper suggests a third possibility: Taxpayers simply may be enjoying greater success at evasion due to a decline in transaction visibility. U.S. taxpayer data show that nonmatchable income has grown from 8.7 percent of reported AGI in 1980 to 18.4 percent in 2000. Applying constant misreporting rates for matchable and nonmatchable income from the 1988 TCMP study, taxpayer underreporting is estimated to have increased from 3.6 percent to 5.6 percent of reported AGI between 1980 and 2000.

The decline in transaction visibility appears related to the trend of widening income inequality. In the last two decades, the top 5 percent of U.S. taxpayers with the highest reported AGI accounted for over 77 percent of the increase in nonmatchable income. Preliminary evidence is found for the hypothesized relationship between income inequality and a measure of tax noncompliance for a sample of 23 developed and developing nations. This finding supports the view that a widening variation in taxpayer incomes, and the associated decline in transaction visibility, could be contributing to the presumed growth in taxpayer noncompliance.

References

- Alm, James (2000), "Tax Compliance and Tax Administration" in *Handbook on Taxation*, edited by W. Bartley Hildreth and James A. Richardson, Marcel Dekker, Inc., New York, NY.
- Andreoni, James; Erard, Brian; and Feinstein, Jonathan, "Tax Compliance," *Journal of Economic Literature* 36 (June 1998), pp. 818-860.
- Campbell, David and Parisi, Michael, "Individual Income Tax Returns, 2000," *SOI Bulletin* (Fall 2002), pp. 7-44.
- Christian, Charles W., "Voluntary Compliance With The Individual Income Tax: Results From the 1988 TCMP Study," *The IRS Research Bulletin*, IRS Publication 1500 (Rev. 9-94) (1993/1994), pp. 35-42.
- Deininger, Klaus W. and Squire, Lyn (1996), "A New Data Set Measuring Income Inequality," *World Bank Economic Review* (Volume 10), pp. 565-591.
- Data download site: <http://www.worldbank.org/research/growth/dddeisqu.htm>.
- Downs, Anthony (1957), *An Economic Theory of Democracy*, Harper and Row.
- Ehrlich, I., "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation," *Journal of Political Economy* 81 No. 3 (1973), pp. 521-565.
- Fajnzylber, Pablo; Lederman, Daniel; and Loayza, Norman (1998), *Determinants of Crime Rates in Latin America and the World: An Empirical Assessment*, The World Bank, Washington, DC.
- Forest, Adam and Sheffrin, Steven M., "Complexity and Compliance: An Empirical Investigation," *National Tax Journal* Vol. LV, No. 1 (March 2002), pp. 75-88.
- Gould, Stephen J. (1996), *Full House*, Harmony Books, New York, NY.
- Graetz, Michael J. (1999), *The U.S. Income Tax: What It Is, How It Got That Way, and Where We Go from Here*, W.W. Norton, New York, NY.
- Internal Revenue Service (1996), *Federal Tax Compliance Research: Individual Income Tax Gap Estimates for 1985, 1988, and 1992*, IRS Publication 1415 (Rev. 4-96), Washington, DC.
- Klepper, Steven and Nagin, Daniel (1989), "The Criminal Deterrence Literature: Implications for Research on Taxpayer Compliance" in *Taxpayer Compliance, Vol. 2: Social Science Perspectives*, edited by Jeffrey A. Roth, John T. Scholz, and Ann D. Witte, University of Pennsylvania Press, Philadelphia, PA.

Long, Susan and Swingen, Judyth (1990), "Third Party Information Reporting and Compliance" in *Research Conference Report, How Do We Affect Taxpayer Behavior?*, Internal Revenue Service Document 7302 (3-91), Washington, DC.

Roth, Jeffrey A.; Scholz, John T.; and Witte, Ann D. (1989), *Taxpayer Compliance, Vol. 1: An Agenda for Research*, University of Pennsylvania Press, Philadelphia, PA.

Schneider, Friedrich, *The Size and Development of the Shadow Economies and Shadow Economy Labor Force of 22 Transition and 21 OECD Countries: What Do We Really Know?*, invited paper prepared for the Round Table Conference: "On The Informal Economy," Sofia, Bulgaria, April 18-20, 2002.

Schneider, Friedrich and Enste, Dominik H., "Shadow Economies: Size, Causes, and Consequences," *Journal of Economic Literature* 38 (March 2000), pp. 77-114.

Notes

¹ According to Schneider and Enste (2000), the shadow economy includes legal income-producing activities that are not reported to tax authorities. This definition excludes all illegal activities, voluntary social services, and unpaid or "pure" household production.

² Although most experts agree there is little hard evidence to support this claim.

³ The estimate for nonmatchable income excludes Informal Supplier Income. Estimates reflect weighting based on share of reported adjusted gross income (AGI).

⁴ Includes reported income from non-farm proprietors, partnerships, and small business corporations.

⁵ See <http://www.census.gov/hhes/income/histinc/f04.html>.

⁶ Internal Revenue Service, Statistics of Income Division, unpublished statistics, September 2002.

⁷ The Pearson correlation coefficient between the inequality measure and ratio of total tax to GDP equals -0.732 and is significant at the 1-percent level, indicating that, as inequality increases, the relative tax burden declines. This observation would seem to lend support to certain economic theories of democracy (see Downs, 1957) that imply highly polarized societies tend to disagree on distributional issues affecting tax policy, resulting in a lower level of public support for taxation.