The Distribution of Income Tax Noncompliance

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September 12, 2008

We are grateful to Ed Emblom, Mark Mazur, and Alan Plumley for allowing access to the National Research Program data, and to Alan for many helpful discussions about its methodology. We also would like to acknowledge Kim Bloomquist for developing the Individual Underreporting Tax Gap Model and Brian Erard and Jonathan Feinstein for developing and implementing the Detection Controlled Estimation methodology. We also thank Alan, Brian, Ed, Jonathan, Kim, and Mark for helpful comments on an earlier draft, but take sole responsibility for the content. The content of this article is the opinion of the authors and does not necessarily represent the position of the Internal Revenue Service.

MOTIVATION AND INTRODUCTION

In this paper we use the newly available data from the IRS's most recent comprehensive study of individual income tax noncompliance, the National Research Program, to assess the distributional consequences of income tax noncompliance in the U.S. federal income tax for the tax year 2001. We find that, when taxpayers are arrayed by their "true" income, defined as reported income adjusted for the underreporting estimated by the IRS tax gap methodology, the ratio of aggregate misreported income to true income generally increases with income, although it peaks among taxpayers with adjusted gross income between $500,000 to $1,000,000, and is lower than the peak ratio for individuals with income above $1,000,000. In sharp contrast, though, the ratio of underreported tax to true tax is highest for lower-income taxpayers. This contrast in results reflects the fact that under a graduated tax schedule a given percentage reduction in taxable income corresponds to a higher percentage reduction in tax liability the lower is a taxpayer's income. Much of the distributional pattern of noncompliance is related to the fact that on average high-income taxpayers receive their income in forms that have higher noncompliance rates. But this is not the whole story. If we assign the average rate of noncompliance for each income source to all taxpayers, the counterfactual variation in misreporting percentage by income class comes close to the actual pattern, but underestimates the actual ratio for upper middle-income groups. The inequality of true adjusted gross income (AGI), as measured by the Gini coefficient, is slightly below that of reported AGI, while the inequality of true AGI minus reported income tax is slightly higher than that of reported AGI minus reported income tax.

DATA SOURCE AND METHODOLOGY

The estimates in this paper are based on data from the National Research Program (NRP) Individual Income Tax Reporting Compliance Study for the 2001 tax year, supplemented with IRS-calculated estimates of unreported income that examiners were unable to detect.[1] The methodology for measuring the individual income tax underreporting gap has three components: (1) errors detected by examiners during

[1] For details, see U.S. Department of the Treasury (2005a, 2005b, 2005c) and Plumley (2005).

random audits, including over-reporting of deductions, offsets, and credits (2) adjustments for unreported income that the examiners were unable to detect during those audits, and (3) average marginal tax rates applied to the total estimated underreporting of each type of income and to the over-reporting of offsets to income. Adjustments for undetected income make use of an econometric technique called "detection controlled estimation" (DCE).[2]

For tax year 2001, the NRP selected a stratified random sample of approximately 45,000 returns. Data exclusions, primarily due to data anomalies, resulted in a subset of 36,699 returns used for the tax gap analysis.[3] Sample details are shown in Table A1. Each case in the original sample was given a base weight equal to the inverse of the probability of selection. These weights were then adjusted to account for the excluded cases, so that estimates could be projected to the overall population.

During an initial classification stage, case-building materials such as third-party information returns, prior-year returns, and dependent information were collected by NRP and then reviewed by experienced examiners referred to as classifiers. Based on the results of these reviews, some returns were accepted as filed (i.e., were reasonably believed to have no under-reporting) without any examination, while others were assigned to either correspondence or face-to-face audits.[4]

If a return was assigned to be audited, then the classifier identified which issues, or lines on the returns, were mandatory for the examiner to audit. It was at the examiner's discretion whether to extend the exam beyond those classified lines. It was also at the discretion of the examiner to extend the examination to flow-through entities of which the taxpayer is a partner or shareholder. If the examiner did audit the

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[2] Also included is an estimate of unreported tip income based on typical industry tipping rates, which was allocated proportionally to the amount of tip income actually reported.

[3] An example would be if a taxpayer reported $20,000 of what should be Schedule C income as wage income. Because the type of income may have employment tax consequences, the examiner may increase Schedule C income by $20,000 and decrease wages by $20,000. Line-item compliance estimates generally exclude cases like this example in which the taxpayer enters the income on the wrong line or schedule. Although procedures had been put in place to identify these misclassification errors, initial results showed inconsistencies in how they were handled, and for this reason some returns were excluded from the analysis.

[4] Correspondence audits were limited to returns with at most three compliance issues that could be addressed through documentation requests sent to the taxpayer. Of the 36,699 returns used for this analysis, 84 percent were subject to face-to-face audits, 9 percent were accepted as filed, and 6 percent were subject to correspondence audits. In the remaining (less than 1 percent of) returns, the taxpayer did not respond to the notice, did not show for the examination, or mail addressed to the taxpayer was returned as undeliverable.

partnership or S corporation, those results are reflected in the tax gap estimates. Although the detection-controlled estimation methodology, discussed below, likely accounts for some portion of flow-through income that was not detected during the examination, it is not known whether it accounts for the majority of underreported flow-through income.[5]

The IRS then applied an econometric technique called "detection-controlled estimation" (DCE) to those returns subject to audit, in order to adjust for unreported income that examiners were unable to detect.[6] The DCE methodology, developed in Feinstein (1990, 1991, 2004) is based on a joint maximum likelihood estimation of two equations: (1) a noncompliance equation that models the total amount of underreported income, and (2) a detection equation that models the fraction of noncompliance detected by the IRS examiner. The noncompliance equation models underreported income using a censored regression model and assumes a displaced log-normal distribution. The log of the unobserved magnitude of noncompliance, with a displacement parameter, is modeled as a tobit function of a set of return characteristics as well as dummy variables for various ranges of positive income.

The detection equation allows for the possibility that the ability of IRS examiners to detect noncompliance varies systematically across examiners and classifiers. The model estimates the fraction of detected unreported income modeled as a linear combination of a vector of return characteristics that proxy for the complexity of the return (the number of issues examined and the type of audit) as well as characteristics of the examiner such as the examiner's payscale grade and, for those examiners who perform a sufficient number of audits in the sample, a fixed individual effect.

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[5] The IRS has recently completed an NRP study of S corporations that filed returns for tax years 2003 and 2004. It is expected that the results from that study will be used to supplement the future individual income tax underreporting gap estimates.

[6] In IRS tax gap studies prior to the tax year 2001, estimates of the amount of income not detected during the random audits consisted of multipliers based on a comparison of tax year 1976 audit results from the Taxpayer Compliance Measurement Program (TCMP), a precursor of the NRP, where examiners did not have use of information reporting (IRP) documents with the income reported on those documents. The results of the comparison showed that, for every $1 detected without the use of IRP documents, another $2.28 went undetected. This resulted in the use of a 3.28 multiplier for prior tax gap estimates, with some variations depending on type of income. Feinstein (1991) reports that aggregate tax gap estimates for tax years 1982 and 1987 based on the DCE methodology are remarkably similar to those based on the previous IRS methodology. For background on detection controlled estimation models, see Feinstein (1990, 1991, 2004) and U.S. Department of the Treasury (1996). The 2001 DCE methodology was developed by Brian Erard and Jonathan Feinstein under contract with the IRS.

As Feinstein (1991 and elsewhere) acknowledges, estimating the examiner detection rate is fraught with identification problems, as that rate is never actually observed—what is observed is the product of the true noncompliance rate and the detection rate. As Feinstein (1991, p. 33) puts it: "a given level of average detected violation may be due to a high frequency of evasion and a low frequency of detection…or to the opposite." An intuition for how the DCE procedure resolves this fundamental identification problem is provided in Feinstein (1991, p. 33): "the DCE estimates may be seen as tying down absolute detection rates by finding a set of "best" examiners in the data and assigning them the highest detection rates; all other examiner rates are then determined by comparing their performance to these top examiners."

The DCE analysis was done separately for two groups of returns. A return was allocated to one of the following groups:

1. Returns without reported Schedule C or Schedule F profit or loss, and with reported total positive income (TPI)[7] less than $100,000,
2. Returns with reported Schedule C or Schedule F profit or loss, or with reported total positive income greater than or equal to $100,000.

Within each of these two tax return groups, noncompliance equations were then estimated separately for total income and for "low-visibility" income subject to little or no information reporting, which included farm or nonfarm proprietor income, partnership or S corporation income, rental or royalty income, gains or losses reported on Form 4797, and income reported on the Form 1040 "other income" line. "High-visibility" income had at least some systematic information reporting and included wages and tips, interest and dividends, state and local tax refunds, alimony, capital gains, pensions, unemployment compensation, and Social Security income.

The noncompliance equations that resulted from the DCE analysis were used to estimate the amount of total income underreporting (i.e., detected plus undetected) and the amount of low-visibility income underreporting. Unreported high-visibility income was then set to the difference between these two DCE estimates. Each DCE estimate for total underreported income was divided by the amount of underreporting actually

[7] Total positive income (TPI) is generally the sum of all positive income amounts reported on individual income tax returns, and therefore excludes negative net income amounts.

detected. This procedure generates four separate "multipliers," one for each type of return and income-visibility category:

Non-business returns with reported TPI < $100,000

Low-visibility income: 4.158

High-visibility income: 2.009

Business returns or returns with reported TPI > $100,000

Low-visibility income: 3.358

High-visibility income: 2.340.

The DCE multipliers were then used to calculate, on a return-by-return basis, line-item net misreported amounts (NMAs) by multiplying the amount of underreported income detected during the NRP audit by the appropriate one of the four DCE multipliers. The multiplier was applied only to the detected underreporting of a line item if the sample return was selected for face-to-face audit and the examiner detected some underreported income. Note that this technique assumes that detection rates are similar across line items within each type of return and income-visibility category. The use of the DCE multipliers will understate estimates of undetected income for some taxpayers, and almost certainly will do so for the class of returns subject to correspondence audits and those audited returns where no income underreporting was detected, because no adjustment is made in these cases. Conversely, it may overstate estimates of undetected income for other taxpayers. Note specifically that the use of the multipliers implicitly allocates undetected income in proportion to the amount of income that was detected, within a given income visibility category. To the extent that certain types of low-visibility income are harder to detect than others, the use of the DCE multipliers may also overstate or understate the amount of noncompliance for some income sources.[8]

Note finally that the individual underreporting gap estimates reported here focus only on misreporting on returns filed on a timely basis, and therefore do not take into account all noncompliance by individual taxpayers; IRS estimates a separate tax gap for

[8] The estimates based on the DCE-adjusted NRP subset do not come with standard errors, but we can infer something about the confidence surrounding estimates by looking at Table A1, which shows the number of tax returns, by income class, that comprise the sample.

individual nonfilers, which includes late-filed returns. Nor do the estimates explicitly account for income derived from illegal activities. If the NRP examiner found income from illegal activities during the audit, that income is included but, as this would have been detected incidentally, it likely represents a very small portion of the whole.

NET MISREPORTING

By Income Source

Table 1 presents the aggregate tax gap figures for 2001, by income source, based on the NRP study (U.S. Department of the Treasury, 2006) for the individual income tax and estimates extrapolated from earlier studies for other taxes.[9] The overall gross tax gap estimate is $345 billion, which amounts to 16.3 percent of estimated actual (paid plus unpaid) tax liability.[10] Of the $345 billion estimate, the IRS expects to recover $55 billion through late payments and enforcement actions, resulting in a "net tax gap"—that is the tax not collected—for tax year 2001 of $290 billion, which is 13.7 percent of the tax that should have been paid.

Table 1: Components of the 2001 Individual Income Tax Underreporting Gap

	Tax gap ($billion)	Percentage of the corresponding true amount
Gross Tax Gap	345	16.3
Underreporting	285	
Individual Income Tax	197	18
Underreported Nonbusiness Income	56	4
Wages and salaries	10	1
Net capital gains	11	12
Taxable pension annuities, IRA distributions	4	4
Taxable interest and dividends	3	4

[9] The second column of Table 1 may refer to the percentage of the corresponding true amount of income, offsets to income, credits, or tax depending on the row of the table.

[10] This percentage is not much different than earlier estimates based on extrapolations from the tax gap studies based on 1988 TCMP data (for example, U.S. Department of the Treasury, 1996). However, taking into account changes in methodology and the uncertainty of the estimating procedures, one cannot conclude that the noncompliance rate has remained steady, as opposed to trending up or down.

Other	28	38
Underreported Business Income	109	43
Nonfarm proprietor income	68	57
Partnership, S corporation, estate and net trust income	22	18
Rent and royalty net income	13	51
Farm net income	6	72
Overreported Offsets to Income	15	4
Deductions	14	5
Exemptions	4	5
Statutory adjustments to income	-3	-21
Overreported Credits	17	26
Employment Tax	54	7
Self-employment tax	39	52*
FICA and unemployment taxes	15	2*
Corporation Income Tax	30	17*
Large (>$10 million assets) corporations	25	14*
Small (<$10 million assets) corporations	5	29*
Estate and Excise Taxes	4	4*
Nonfiling	27	1*
Individual Income Tax	25	2*
Other	2	2*
Underpayment	34	
Individual Income Tax	23	2*
Corporation Income Tax	2	1*
Other	9	1*
Enforced and Other Late Payments	55	3*
Net Tax Gap (tax not collected)	290	13.7*

Source: Slemrod (2007), calculated from U.S. Department of the Treasury (2006).
Note: Only the figures for the individual income tax and the self-employment tax are based on the IRS' National Research Program results; the rest are IRS extrapolations from earlier TCMP studies.
* Calculated by the author.

As discussed in Slemrod (2007), about two-thirds of all underreporting of income happens on the individual income tax. For the individual income tax, understated income—as opposed to overstating of exemptions, deductions, adjustments, and credits—accounts for over 80 percent of individual underreporting of tax. Business

income, as opposed to wages or investment income, accounts for about two-thirds of the understated individual income. Taxpayers who were required to file an individual tax return, but did not, accounted for slightly less than 10 percent of the gap. While the individual income tax comprises about two-thirds of the estimated underreporting, the corporation income tax makes up slightly more than 10 percent and the employment tax gap makes up about one-fifth of total underreporting.

Perhaps the most striking aspect of the aggregate tax gap estimates is the huge variation in the rate of misreporting as a percentage of true income by type of income (or offset). Only 1 percent of wages and salaries and 4 percent of taxable interest and dividends are misreported, all of which must be reported to the IRS by those who pay them; in addition, wages and salaries are subject to employer withholding. In sharp contrast, self-employment business income, which is not subject to information reports, has a sharply higher estimated net misreporting percentage (NMP): an estimated 57 percent of nonfarm proprietor income is not reported, a total of $68 billion, which by itself accounts for more than a third of the total estimated underreporting for the individual income tax.[11] Over half is attributable to the underreporting of business income, of which nonfarm proprietor income is the largest component.

Net Misreporting Percentages by True Income Group

The published information about the 2001 tax gap study shown in Table 1 provides no information about the *distribution* of income tax noncompliance across income groups. To investigate this topic, we analyzed the micro data from the NRP along with the DCE-based multipliers.[12]

The basic results are shown in Table 2. In it taxpayers are grouped by the adjusted gross income (AGI) that, according to the tax gap methodology, they should have reported, what we call "true income." In other words, to calculate true AGI the

[11] The numerator of the net misreporting percentage is the sum of all misreporting and includes any overreporting of income. In order to account for sources of income that can take negative values, the denominator of the net misreporting percentage is defined as the sum of the absolute values of the true amounts.

[12] Erard and Ho (2003) analyze the distribution of noncompliance by occupation, based on the tax year 1988 TCMP data.

estimated amount of DCE-adjusted noncompliance due to unreported income was added back to the reported AGI. Grouping taxpayers by reported AGI, rather than true AGI, would paint a misleading picture of the relationship between noncompliance and the true income level as, other things equal, noncompliant taxpayers would appear to have lower income than they really have. It is important to note that Table 2 reports net misreporting percentages by *true* AGI group, where net misreporting percentages are defined as the sum of estimated misreporting divided by the sum of the absolute values of the corresponding true values, be it AGI in the first column and tax after refundable credits in the second column.[13]

Table 2: Net Misreporting Percentages by True AGI, Tax Year 2001

True AGI	NMP for AGI	NMP for Tax after Refundable Credits
No AGI	-9	67
$1-5K	2	74
5K-10K	4	63
10K-15K	4	43
15K-20K	5	35
20K-25K	5	24
25K-30K	6	22
30K-40K	7	19
40K-50K	7	16
50K-75K	8	15
75K-100K	8	14
100K-200K	13	18
200K-500K	20	22
500K-1M	21	21
1M-2M	16	16
>2M	11	11
Total	11	18

Source: National Research Program data.

[13] Tax after refundable credits as defined in this paper does not include self-employment tax.

The first column of Table 2 shows that the net misreporting percentage rises continually with true income, until it peaks at 21 percent for the true AGI class from $500,000 to $1,000,000, whereupon it declines in the next two classes. However, the misreporting percentage for the highest true income class, with true income above $2 million, is still above the NMP for any true income group below $100,000. Splitting taxpayers into two groups, above and below $100,000, clearly reveals that the net misreporting percentage of income is much higher for the higher-income taxpayers: 15.2 percent for those with true income above $100,000, and 7.0 percent for those with true income below $100,000.

Column 2 of Table 2 shows the opposite pattern for the net misreporting percentage for tax after refundable credits. For the most part, it declines with true income, and is highest for taxpayers with less than $25,000 of AGI. The stark difference between column 1 and column 2 of Table 2 reflects the graduated nature of the income tax schedule that implies, putting aside the earned income credit, that the marginal tax rate exceeds the average tax rate. To see the implications of the graduated rate structure, consider individuals at different points of the income distribution. For very high-income people, whose income far exceeds the top bracket cutoff, the marginal tax rate is only slightly higher than the average tax rates, because the benefit of the lower rates, exemptions, and so on, becomes vanishingly small. Thus, for a multimillionaire, understating income by 11 percent understates tax liability by about 11 percent.[14] In contrast, consider a married couple filing jointly using the standard deduction with two dependents with $50,000 of AGI. Based on the 2007 tax rate schedule, their tax liability if reporting accurately is $2,922 (implying an average tax rate of 5.84 percent). If, though, they understate their AGI by 10 percent, so that their reported AGI is $45,000, their tax liability is $2,172, reflecting a drop of $750 in tax liability ($5,000 times the marginal tax rate of 15 percent). Thus, an income misreporting percentage of 10 percent corresponds to a tax misreporting percentage of 25.7 percent ($750 divided by $2,922). In the extreme, a taxpayer whose income is just over the taxable income threshold for

[14] If the understated income is disproportionately in the form of preferentially-taxed capital gains, then it could be that understating income by, say, 11 percent, reduces overall tax liability by less than 11 percent.

having positive tax liability can, by understating their income by a small percentage, completely wipe out their tax liability.[15]

Aggregate Underreporting by AGI Group

Table 3 shows the fraction of aggregate underreporting of AGI and of tax after refundable credits, by true AGI and reported AGI group. Columns 1 and 3 of the table reveal that, when arrayed by true AGI, the majority of underreporting--63 percent--is associated with taxpayers with over $100,000 in true AGI, whether measured in terms of AGI or in terms of tax. This group comprises 11 percent of all taxpayers, 42 percent of total reported AGI and 66 percent of total reported income tax liability.

Table 3: Fraction of Aggregate AGI Underreporting and Underreporting of Tax after Refundable Credits, by True and Reported AGI, Tax Year 2001

AGI	AGI, by True AGI	AGI, by Reported AGI	Tax after Refundable Credits, by True AGI	Tax after Refundable Credits, by Reported AGI
No AGI	**	9	**	5
$1-5K	**	5	**	3
5K-10K	**	7	1	5
10K-15K	1	8	2	7
15K-20K	1	8	3	7

[15] The one published table that we know of that attempts something similar to our Table 2, in Christian (1994), is based on the results of the Taxpayer Compliance Measurement Program (TCMP), the forerunner of the NRP, for tax year 1988; it is shown in Table A2. First, note that Table A2 presents measures of the voluntary compliance level, defined as reported tax liability divided by corrected tax liability, so it is similar to, although the obverse of, what is reported here in column 2 of Table 2. However, the methodology was significantly different from the one used to create Table 2 and therefore the two tables are not readily comparable. First, the Voluntary Compliance Levels (VCLs) reported in Table A2 are based on the raw TCMP results (i.e., the results were not adjusted for undetected underreported income. Second, and more important, the taxpayers are grouped by reported AGI rather than true AGI). Nonetheless, even with these caveats in mind, the results in Table A2 are somewhat similar to those in column 2 of Table 2. Both tables indicate that the rate of misreported tax declines with income, but the effect is more pronounced in Table A2 because it is arrayed by reported income. This amplifies the effect because, other things equal, those who claim to have low income are on average more noncompliant than those who report that they have high income.

20K-25K	1	7	2	7
25K-30K	2	7	2	6
30K-40K	4	8	4	8
40K-50K	4	7	4	8
50K-75K	12	11	10	12
75K-100K	10	6	9	7
100K-200K	23	9	21	12
200K-500K	20	7	20	10
500K-1M	8	1	9	2
1M-2M	4	**	5	1
>2M	8	1	8	1
Total	100	100	100	100

** Less than 0.5%.

Table 3 also shows how misleading it can be to draw conclusions about the distribution of tax noncompliance based on reported AGI. Comparing Column 2 to Column 1 or comparing Column 4 to Column 3 shows that using reported income as the grouping concept misleadingly suggests that noncompliance is overwhelmingly a phenomenon of the low and middle-income classes. According to Column 2, 66 percent of underreporting is associated with tax returns with $50,000 or less of AGI. Column 1 reports that the more appropriate percentage is 13. For tax after refundable credits, Column 4 misleadingly suggests that 56 percent of underreporting is done by those with less than $50,000 of AGI, while Column 3 reports that a more accurate percentage is just 18.

BY LINE ITEM

The pattern of noncompliance by true income group raises the question of whether high-income taxpayers have generally higher income misreporting percentages because they receive the types of income generally misreported, as Bloomquist (2003) suggests, or whether certain types of income have higher misreporting percentage because they are received more by high-income people. The analysis of this section suggests that both factors are at play, but that the former predominates.

We first note that high-income taxpayers are much more likely to receive their income in a form that, for reasons to be discussed later, have relatively high average misreporting percentages. Table A3 shows, based on SOI data on reported income, that wages and salaries, which are subject to very low misreporting rates, comprise a much higher percentage of AGI for lower-income groups. The mirror image of this is that the high-income groups receive a higher percentage of their income in the form of partnership and Subchapter S business income and, especially, long-term capital gains that have higher overall misreporting rates.[16]

To pursue this issue, we first present in Table 4 misreporting percentages by true AGI group for each of several income sources. Table 4 shows clearly that, within categories of income that are subject to relatively high misreporting percentages (the last three columns), the misreporting percentage is higher for the high-income groups. Note, though, that as with the overall misreporting percentage by true income group shown in Table 2, this percentage peaks in a high, but not the highest, income group.

Table 4: Net Misreporting Percentages of Selected Income Sources, by True AGI, Tax Year 2001

True AGI	Salaries and Wages	Interest	Dividends	Business (Sch C)	Part., S Corp, Estate & Trust	Capital Gains
No AGI	-39	**	**	-17	1	-15
$1-5K	3	3	*1	-16	**	-9
5K-10K	4	2	2	15	*-1	-18
10K-15K	3	2	3	26	*2	5
15K-20K	2	3	2	38	*4	8
20K-25K	1	3	7	45	7	22
25K-30K	3	2	3	48	*7	3
30K-40K	2	3	4	56	19	19
40K-50K	1	3	4	58	10	17

[16] Table A4 recalculates the shares of true income based on the NRP estimates of true income, and Table A5 presents the shares of reported income based on the NRP estimates of reported income.

50K-75K	1	3	3	62	11	22
75K-100K	1	9	2	61	7	17
100K-200K	1	2	5	62	18	18
200K-500K	1	8	4	55	22	24
500K-1M	1	2	3	58	26	18
1M-2M	**	3	3	52	19	10
>2M	**	**	4	53	15	1
Total	1	4	4	57	18	12

* Estimate based on fewer than 10 observations.

** Less than 0.5 percent.

As a further exercise, Table 5 presents a counterfactual distribution of the net misreporting percentage. Table 5 shows the by-income-group misreporting percentage and aggregate fraction of underreported income under the counterfactual assumption that the misreporting percentage for each type of income is equal to the overall misreporting percentage for that type of income, and does not vary by income group. Columns 1 and 3 reproduce, for the sake of easy comparison, Columns 1 and 3 of Tables 2 and 3, respectively. It is clear that the "true" columns and the "counterfactual" columns are quite similar, suggesting that the variation in type of income received is the major cause of variation by income groups in net misreporting percentages. But there is some divergence; in particular, the NMPs of those returns with true income between $75,000 and $1,000,000 are all higher than their income source breakdown would suggest.

Table 5: Net Misreporting Percentage and Fraction of Underreported Total Income, True vs. Counterfactual of Non-Income Varying NMPs for Each Income Source, Tax Year 2001

	Net Misreporting Percentage		Fraction of Underreported Income	
True AGI	**True**	**Counterfactual**	**True**	**Counterfactual**
No AGI	-9	102	**	2
$1-5K	2	10	**	**
5K-10K	5	8	**	1

10K-15K	4	7	1	1
15K-20K	5	6	1	1
20K-25K	5	6	1	2
25K-30K	6	6	2	2
30K-40K	7	7	4	4
40K-50K	7	7	4	4
50K-75K	8	8	12	12
75K-100K	9	8	10	10
100K-200K	13	12	23	21
200K-500K	20	18	20	18
500K-1M	21	17	8	7
1M-2M	16	17	4	5
>2M	11	15	7	10
Total	11	11	100	100

** Less than 0.5 percent.

Thus, the differential sources of income can explain some, but not all, of the distributional pattern of income tax noncompliance. What else might? A model of rational tax noncompliance suggests that, depending on the relationship of penalties to the amount and nature of noncompliance, higher marginal tax rates would induce more noncompliance [17], but lower noncompliance would result from a higher perceived probability of detection, a higher perceived effect of the level of noncompliance on the perceived probability of detection, and the accompanying penalty on detected evasion. On average higher-income taxpayers face higher marginal tax rates. Microeconometric analysis of the NRP data, along the lines of Clotfelter's (1983) analysis of the 1969 TCMP data might be insightful, but this kind of exercise is hampered by the lack of extensive demographic information on tax returns, the limited variability of marginal tax rate conditional on income, and extremely limited information on variations in perceived probability of detection (indeed limited to average audit rates across broad classes of

[17] Although, it is important to note the point made by Yitzhaki (1979) that, when the penalty for a given amount of evasion is a fraction of the detected tax evasion, a higher tax rate automatically increases the penalty for a given amount of taxable income understatement. In this case an increase in the tax rate does not change the terms of a tax evasion gamble, and has only an income effect; under usual assumptions about risk aversion, this implies that a tax rate increase would reduce, rather than increase, evasion.

income, and presence of business income). Controlled experiments, for example as reported in Slemrod, Blumenthal, and Christian (2001), have the promise of more compelling identification of the possible determinants of noncompliance, but are rare.[18]

IMPLICATIONS FOR ESTIMATES OF INCOME DISTRIBUTION AND TAX PROGRESSIVITY

Recognizing the distributional pattern of income tax noncompliance has implications for our understanding of income inequality and the effective progressivity of the income tax system. In this section we see to what extent estimates of each are affected by adjustments based on the DCE-corrected estimates of noncompliance.

True versus Apparent Distribution of Adjusted Gross Income

Table 6 shows the distribution of (pretax) AGI, as reported and as adjusted for estimated noncompliance. In each case the income groups are defined as per the associated concept being measured; that is, true AGI percentages are calculated over all tax returns in the appropriate group, and true AGI percentages are arrayed by true AGI groups. The second column, reported AGI arrayed by reported AGI groups, corresponds to what we would find in the aggregate statistics routinely published by the Statistics of Income Division of the IRS.

Table 6 reveals that the distribution of true AGI is more concentrated among the upper income groups than is reported AGI. The percentage of total AGI is higher for true income for each AGI group above $100,000, and is lower for every group below $75,000. Consider, as one summary measure of the difference, that 44.6 percent of true AGI is received by taxpayers with over $100,000 of true income, but only 40.3 percent of reported income is received by those with reported income over $100,000.

Of course, some of the increased apparent concentration of true income arises because true income always exceeds reported income, by definition. The third column of Table 6 shows the counterfactual distribution of AGI if all reported AGIs were increased so that each taxpayer underreported their true AGI by 10.6 percent, the aggregate net

[18] See Andreoni, Erard, and Feinstein (1998) or Slemrod and Yitzhaki (2002) for surveys of the empirical literature on tax noncompliance.

misreporting percentage for AGI.[19] The counterfactual true AGI percentages are then arrayed by the counterfactual true AGI.

Table 6: Distribution of True AGI and Reported AGI, Tax Year 2001

AGI	True AGI	Reported AGI	Counterfactual True AGI
No AGI	-0.2	-0.4	-0.3
$1-5K	0.4	0.5	0.4
5K-10K	1.1	1.4	1.2
10K-15K	1.8	2.3	1.8
15K-20K	2.8	3.2	2.5
20K-25K	3.0	3.6	3.1
25K-30K	3.4	3.8	3.3
30K-40K	6.9	7.5	6.9
40K-50K	7.0	7.8	6.8
50K-75K	16.5	17.3	16.3
75K-100K	12.6	12.6	12.9
100K-200K	19.2	17.6	20.6
200K-500K	11.1	9.4	10.3
500K-1M	4.3	3.7	4.1
1M-2M	2.9	2.7	2.7
>2M	7.1	6.9	7.3
Total	100.0	100.0	100.0

True versus Apparent Distribution of Tax Liabilities

Table 7 shows how the distribution of individual income tax liability changes when the reported figures are adjusted to reflect estimated noncompliance. As in Table 6, the second column shows the distribution of reported tax liability when taxpayers are grouped by their reported AGI; this is similar to what could be learned from the published statistics based on tax returns as filed.

[19] Negative reported AGIs were increased 9.6 percent and positive reported AGIs were increased 11.9 percent to achieve this outcome.

Table 7: Distribution of True Tax Liability and Reported Tax Liability, Tax Year 2001

AGI	True Tax Liability (After Refundable Credits)	Reported Tax Liability (After Refundable Credits)
No AGI	**	**
$1-5K	-0.1	-0.2
5K-10K	-0.2	-0.8
10K-15K	-0.3	-1.0
15K-20K	0.3	-0.2
20K-25K	0.9	0.8
25K-30K	1.5	1.7
30K-40K	3.9	4.2
40K-50K	4.6	5.2
50K-75K	12.4	13.4
75K-100K	11.2	11.9
100K-200K	21.4	21.0
200K-500K	16.9	15.9
500K-1M	8.0	7.5
1M-2M	5.6	5.7
>2M	13.8	14.9
Total	100.0	100.0

** Less than 0.5 percent.

Changes in Inequality as Measured by Gini Coefficients

The first column of Table 8 summarizes the impact of misreporting on the inequality of various concepts of pretax and posttax income in tax year 2001 by calculating Gini coefficients. The first two rows show that inequality of true (pretax) AGI, as measured by the Gini coefficient, is actually slightly lower than the inequality of reported AGI: 0.56974 versus 0.57273. On the surface, this result seems inconsistent with the result of Table 6 that shows a higher fraction of AGI received by upper-income groups when the income concept is true AGI rather than reported AGI. But these are not necessarily inconsistent, because in Table 6 the true AGI distribution refers to a counterfactual in which aggregate income increases substantially, so of course on average people will be moved into higher income classes. This will occur even if everyone's true income was a constant proportion higher than their true reported income. To illustrate this point, consider that the 99th percentile of reported income in 2001 was approximately $295,000 and 17.8 percent of reported income was reported on tax returns with at least that amount. In contrast, the 99th percentile of true income was approximately $340,000, but the percentage of total true income received on tax returns with at least that amount of true AGI remained 17.8 percent.

Whether the results in Table 8 are consistent with those shown in Table 3 is a more subtle issue. They seem not to be consistent with the first column of Table 3, which shows generally increasing misreporting percentages as true income increases. But the comparison of Gini coefficients is not a marginal concept, and accounting for underreported income causes re-ranking of individuals.[20] In other words, for the first dollar of underreporting, the second column of Table 3 is more indicative of the effect on income inequality, and it suggests a decline in inequality. The difference in the Gini coefficient reflects both the first-dollar marginal effect, the last dollar marginal effect suggested by Column 1 of Table 3, and all the inframarginal dollars of underreporting.

[20] See Bishop, Formby, and Lambert (2000) for more discussion of the relevance of re-rankings and its effect on computed Gini coefficients.

Table 8: Gini Coefficients for Various Income Measures, Tax Years 2001 and 1988

Income Measure	2001 NRP	1988 TCMP[1]
Reported AGI	0.57273	0.5276
True AGI	0.56974	0.5252
Reported AGI – Reported Tax	0.53223	0.5024
True AGI – True Tax	0.53217	0.4999
True AGI – Reported Tax	0.53724	n.a.

[1]Bishop, Formby, and Lambert (2000, Table 1, Row 13)

The third and fourth rows of Table 8 shows that the difference between the Gini coefficient of true and reported after-tax income is much smaller than the difference between reported and true pretax income. Comparing the first and third, or second and fourth rows, shows that the income tax system reduces the inequality of income, as measured by the Gini coefficient, by 0.04040 or 0.03757, for true and reported income, respectively.

The fifth row shows the Gini coefficient of true income minus reported tax; this is the appropriate concept of after-tax income assuming that none of the misreported income is detected or ever paid. Not surprisingly, this concept has a higher Gini coefficient than either the third or fourth row, because it adds back in unreported income without any accompanying, and inequality-reducing, tax liability.

The second column of Table 8 shows the tax year 1988 results from Bishop, Formby, and Lambert (2000), who analyze the micro data from the 1979, 1982, 1985, and 1988 TCMP studies to assess the effects of noncompliance and tax evasion on the vertical (and horizontal) distribution of after-tax income and tax burden. They find, as we do for tax year 2001, that including unreported income as measured by the TCMP studies[21] has only a very small (negative) impact on pretax income inequality as measured either by the standard Gini coefficient or the extended Gini developed by Yitzhaki (1983) that can

[21] Bishop, Formby, and Lambert (2000) appear to consider income taxes but not self-employment taxes, as we do here. There is no explicit statement about whether they make use of the multiplier that adjusts for undetected income, although their results suggest that they do.

place more or less weight on the lower part of the income distribution. Including both unreported income and additional taxes owed also has a small impact on inequality.

A comparison across columns for 2001 and 1988 reveals that income inequality rose significantly over this period; this has been noted in scores of other studies. Second, if the effect of the tax system on inequality is measured by the difference between the Gini coefficient for true income and the Gini coefficient for true income minus true tax, the decline is larger in 2001 (0.03757) than it was in 1988 (0.0253). This suggests that the tax system in 2001 was more successful at reducing what otherwise would be a higher level of pretax inequality. Note, though, that a better way to measure the change in the redistributional effect of the income tax system would be to compare the change in the difference between the Gini coefficient of true income and the Gini coefficient of true income minus reported tax, as in the fifth row of Table 8, but Bishop, Formby, and Lambert (2000) do not report the latter statistic.

CAVEATS AND CONCLUSIONS

A few caveats must accompany the presentation of the results. The first, and most obvious, is that the NRP estimates of noncompliance are just that–estimates. To the extent that there is systematic error related to true income, the results we present here misrepresent the reality of how noncompliance varies by income group. This is a cause for substantial concern given the plausible possibility of systematic differences in the ability of auditors to detect misreporting by type of income, the plausible possibility that the misreporting of upper-income taxpayers is more sophisticated and thus harder to detect, and the inability of the Detection Controlled Estimation procedure to completely correct for both of these factors.

Second, noncompliance has attendant costs that are not measured here.[22] There is the risk involved due to the uncertainty of ultimate remittance and penalty. There are often real costs incurred to identify and implement certain noncompliance strategies, and to camouflage them. Indeed, a rational model of tax noncompliance, as first outlined by Allingham and Sandmo (1972), suggests that, at the margin, the expected utility of tax

[22] Note also that some of the noncompliance would have been detected in the ordinary course of enforcement, upheld upon appeal and ultimately remitted, perhaps with attendant penalties added.

savings will be exactly offset by the expected utility of costs. Of course, this marginal condition does not imply that there is no private gain from engaging in noncompliance. With assumptions about the nature of these offsetting costs, one can quantify the adjustments needed to calculate the net-of-cost gain. For example, if the marginal cost was linearly increasing in the amount of noncompliance and was equal to zero at zero noncompliance, then the net-of-cost gain would be exactly half of the gross-of-cost gain that we calculate in this paper. If the marginal costs were increasing in the amount of noncompliance, then the net-of-cost gain would exceed half of the gross-of-cost gain. Rather than presenting net-of-cost figures based on arbitrary assumptions about the cost of misreporting function, we present unadjusted figures accompanied by this caveat.

Subject to these caveats and the others mentioned throughout the paper, we tentatively conclude that, when taxpayers are arrayed by their "true" income, the ratio of aggregate misreported income to true income generally increases with income, although it peaks among taxpayers with adjusted gross income between $500,000 to $1,000,000, and is lower than the peak ratio for individuals with income above $1,000,000. In sharp contrast, the ratio of underreported tax to true tax is higher for lower-income taxpayers, reflecting the fact that under a graduated tax schedule a given percentage reduction in taxable income corresponds to a higher percentage reduction in tax liability the lower is a taxpayer's income. Much, but not all, of the distributional pattern of noncompliance is related to the fact that on average high-income taxpayers receive their income in forms that have on average higher noncompliance rates.

Appendix Tables

Table A1: Sample Size and Weighted Number of Returns by Level of True AGI based on TY 2001 Tax Gap Model

True AGI	Number of Returns in Sample	Weighted Number of Returns (Thous.)
No AGI	352	600
$1-5K	1,101	10,575
5K-10K	1,216	10,270
10K-15K	1,725	10,072
15K-20K	1,672	10,801
20K-25K	1,501	9,152
25K-30K	1,790	8,419
30K-40K	3,210	13,624
40K-50K	2,739	10,630
50K-75K	5,777	18,416
75K-100K	3,456	10,036
100K-200K	5,275	9,941
200K-500K	4,727	2,607
500K-1M	1,159	438
1M-2M	648	146
>2M	360	83
Total	36,699	125,808

Table A2: Voluntary Compliance Levels by AGI, 1988

AGI	Voluntary Compliance Level
$0-5K	84.2
5K-10K	78.7
10K-25K	88.8
25K-50K	92.4
50K-100K	93.2
100K-250K	91.3
250K-500K	95.7

>500K	97.1

Note: Voluntary compliance level is reported tax liability divided by corrected tax liability.
Source: Christian (1994), based on 1988 TCMP.

Table A3: Composition of Reported Income by Reported AGI Based on TY 2001 SOI Estimates

Reported AGI	Salaries and Wages	Interest	Dividends	Business (Sch. C)	Part., S Corp, Estate & Trust	Capital Gains	Other
No AGI	-19.5	-7.0	-2.7	8.5	41.7	-7.7	86.7
$1-10K	79.1	4.9	2.5	8.5	-0.6	0.2	5.3
10K-20K	75.1	4.4	1.6	5.1	0.2	0.6	13.0
20K-30K	81.1	2.9	1.1	3.4	0.3	0.4	10.8
30K-40K	82.4	2.6	1.0	3.0	0.3	0.5	10.2
40K-50K	81.6	2.4	1.1	2.5	0.6	0.5	11.3
50K-75K	80.4	2.4	1.2	2.7	0.9	0.8	11.6
75K-100K	80.6	2.4	1.3	2.9	1.2	1.1	10.5
100K-200K	76.5	2.7	1.9	4.2	3.0	3.0	8.7
200K-500K	63.7	3.4	2.9	6.2	10.5	7.5	5.8
500K-1M	52.4	4.0	3.6	3.9	18.8	13.2	4.1
1M-2M	43.3	5.0	4.2	2.6	22.2	18.6	4.1
>2M	32.8	5.5	4.2	1.3	16.3	37.1	2.8
Total	74.0	3.2	1.9	3.5	3.9	5.3	8.2

Source: Authors' calculations based on Table 1 in Campbell and Parisi (2003).

Table A4: Composition of True Income by True AGI Based on TY 2001 Tax Gap Model

True AGI	Salaries and Wages	Interest	Dividends	Business (Sch. C)	Part., S Corp, Estate & Trust	Capital Gains	Other
No AGI	-16.6	-11.4	-6.0	0.0	55.0	-14.8	93.8
$1-10K	79.3	5.2	1.9	5.5	-0.3	0.7	7.6
10K-20K	74.2	5.0	1.7	4.7	0.2	0.5	13.7
20K-30K	79.6	2.6	1.2	4.9	0.4	0.3	11.1
30K-40K	77.8	2.5	0.9	5.4	0.6	0.5	12.2
40K-50K	78.7	2.2	0.9	5.7	0.4	0.2	11.9
50K-75K	74.6	2.5	1.1	6.5	1.0	0.8	13.4
75K-100K	74.0	2.6	1.3	7.3	1.3	1.4	12.2
100K-200K	66.8	2.4	1.7	11.1	3.5	2.5	12.0
200K-500K	51.0	2.8	2.5	15.2	11.5	6.5	10.4
500K-1M	41.6	3.3	3.1	11.4	20.7	12.1	7.8
1M-2M	33.9	5.2	4.5	7.2	23.0	15.9	10.3
>2M	31.4	3.5	2.5	3.3	26.9	25.2	7.2
Total	65.8	2.9	1.7	8.1	5.7	4.4	11.3

Table A5: Composition of Reported Income by Reported AGI based on TY 2001 Tax Gap Model

Reported AGI	Salaries and wages	Interest	Dividends	Business (Sch. C)	Part., S-Corp, Estate & Trust	Capital Gains	Other
No AGI	-19.8	-8.3	-5.1	7.5	46.0	-10.3	90.0
$1-10K	78.1	4.9	1.9	8.1	-0.3	0.4	7.0
10K-20K	75.0	5.0	1.7	5.2	0.1	0.5	12.5
20K-30K	82.8	2.6	1.1	3.3	0.4	0.3	9.5
30K-40K	81.9	2.8	0.9	2.6	0.7	0.1	10.9
40K-50K	82.9	2.0	0.9	2.8	0.7	0.2	10.5
50K-75K	79.5	2.8	1.2	2.6	0.9	0.6	12.4
75K-100K	80.1	2.4	1.4	2.7	1.4	1.2	10.8
100K-200K	75.0	2.7	2.0	4.5	3.5	2.4	10.0
200K-500K	62.6	3.3	2.9	7.3	11.5	6.4	6.1
500K-1M	51.8	4.5	3.9	4.6	18.7	12.4	4.0
1M-2M	39.4	5.2	5.8	4.2	22.7	16.8	5.8
>2M	35.5	3.8	2.5	1.5	26.3	28.1	2.2
Total	72.8	3.1	1.8	3.7	5.1	4.3	9.1

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