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Progressive and Regressive Taxation in the United States: Who's Really Paying (and Not Paying) their Fair Share?

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Abstract

The political debate over recent reforms of the federal income tax in the United States has focused attention on the fairness of taxes. While the Bush administration claims its reforms make taxes fairer, critics counter that the majority of the tax cuts accrue to the wealthy. While the fairness of the federal income tax is an important issue, little attention has been paid to a more important issue: the fairness of the entire U.S. tax system. The federal income tax is one of the most progressive elements of the U.S. tax system; other taxes are regressive including sales and social insurance taxes. Analysis of any particular tax reform proposal is incomplete without consideration of its impact on the overall distribution of taxes.

This paper measures the progressiveness (or regressiveness) of each major element of the U.S. tax system, as well as of the tax system as a whole. While the tax system contains a mixture of progressive and regressive taxes, the overall system is slightly progressive. A look at the historical record suggests that the overall distribution of taxes in the United States is currently similar to the distribution of the 1970s. The trend has not been stable though – federal taxes became less progressive during the 1980s and more progressive during the 1990s.

Data on the distributional implications of the recent Bush tax cuts indicates a decline in the progressivity of the federal income tax. When assessed in light of all taxes in the U.S., tax cuts to be phased-in under current legislation threaten to reduce or even eliminate any progressiveness from the U.S. tax system. This possibility is particularly likely if tax cuts scheduled for sunset are renewed. Thus, legislators and commentators need to be aware that even if the federal income tax remains quite progressive, the overall U.S. tax system is tending towards a system that falls on each household in approximate proportion to income. The current trend towards a less progressive federal income tax and more regressive state taxes suggests that in the foreseeable future the United States could have a tax system that is regressive overall.

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Note: This analysis has been updated - see GDAE Working Paper 10-07.

I. Introduction

The Jobs and Growth Act of 2003, signed into law by President Bush on May 28, 2003, is touted by the administration as a "victory for American workers, American families, American investors and American entrepreneurs and small businesses."[1] The administration specifically notes that a "married couple with two children and income of $40,000 will see their taxes decline under the Jobs and Growth Act of 2003 by $1,133 – from $1,178 to $45 in 2003, a decline of 96 percent."[2]

Is this hypothetical family really almost tax-free under the new legislation? Of course not – if the administration were being precise, they would note that this family only sees their *federal income taxes* decline by 96%, not their overall tax burden. The Jobs and Growth Act of 2003, along with the Economic Recovery and Tax Relief Act of 2001, have focused on the reduction of federal income tax rates. However, households pay many other taxes besides federal income taxes. The administration's hypothetical family still directly pays over $3,000 per year in federal social insurance taxes[3], and likely pays thousands of dollars a year in property taxes, sales taxes, and excise taxes as well.

The relevant point is that the federal income tax, while it has been the primary target for tax cutting by the Bush administration, is only a part of the overall tax burden on the typical American household. In reality, it is *not* the largest single tax on most households – the majority of households pay about twice as much in federal social insurance (payroll) taxes as federal income taxes (CBO, 2001). The administration's zeal with cutting federal income tax rates is noteworthy for another reason. The federal income tax is one of the most progressive taxes levied in the U.S.[4] The overall effect of the Bush tax cuts has been to reduce the degree of progressivity of federal income taxation (CTJ, 2003). Reducing progressiveness in the federal income tax, ceteris paribus, reduces the progressiveness of the overall tax system as well.

Most of the rhetoric regarding the fairness of taxes in the U.S. focuses on the distributional implications of a particular type of tax. Notably absent from the political debate on taxation is exactly how recent changes in the progressiveness of the federal income tax have changed the overall distribution of taxes. Despite claims by politicians regarding the fairness of a particular tax reform, tax fairness should be judged on the basis of the *entire* tax system on different individuals and households. While opinions on the fairness of a tax system ultimately involve subjective value judgments (Slemrod and

[1] http://www.whitehouse.gov/infocus/economy/index.html, accessed July 29, 2003.
[2] http://www.whitehouse.gov/infocus/economy/index.html, accessed July 29, 2003.
[3] This assumes the entire $40,000 of income is from salaries and wages subject to federal social insurance taxation at an overall rate of 7.65%.
[4] The most progressive federal tax, the estate tax, is scheduled for rate reductions and temporary elimination under the Economic Recovery and Tax Relief Act of 2001.

Bakija, 2000), incomplete analysis of the burden of taxation is likely to produce misleading and potentially unjust policy recommendations.

This paper aims to present a comprehensive overview of taxation in the U.S. for those who seek to comment on current and proposed tax policies. The three questions this paper seeks to answer are:

1. How progressive is the overall U.S. tax system? Which taxes are progressive, which are regressive?
2. How has the progressiveness of the U.S. tax system changed in recent decades? Is it becoming more or less progressive?
3. How will the progressiveness of the U.S. tax system likely change in the near future?

The next three sections of this paper provide the background material necessary to address these issues. These sections present an overview of the U.S. tax system, the theory of tax incidence, and a methodology for measuring tax progressivity. We then use these concepts to answer the three questions listed above.

II. A Brief Overview of the U.S. Tax System

A tax can be progressive, regressive, or proportional. By a progressive tax, we mean that the *percentage* of income an individual (or household) pays in taxes tends to increase with increasing income. Not only do those with higher incomes pay more in total taxes, they pay a higher *rate* of taxes. This is the essence of a progressive tax. For example, a person making $100,000 in a year might pay 25% of her income in taxes ($25,000 in taxes), while someone with an income of $30,000 might only pay a 10% tax rate ($3,000 in taxes).

A tax system may also be regressive or proportional. A regressive tax system is one where the proportion of income paid in taxes tends to decrease as one's income increases. A proportional, or flat,[5] tax system simply means that everyone pays the same effective tax rate regardless of income. A particular tax system may display elements of more than one approach. An example would be a system where one pays a flat rate on income below a certain dollar amount and then progressively increasing rates above that dollar amount.

The U.S. tax system, like that in most countries, contains a mixture of progressive and regressive taxes. The tax system in the U.S. includes taxes levied at the federal, state, and local levels. The five primary federal tax mechanisms are personal income taxes, corporate taxes, social insurance taxes, estate taxes, and excise taxes. There are also five major sources of state and local revenue: personal income taxes, corporate taxes, property

[5] This is not exactly the same concept embodied in current proposals for a "flat tax" in the U.S. These proposals would set just one tax rate but would exclude a given amount of income from taxation. Thus, the flat tax proposals would retain a small degree of progressivity.

taxes, sales taxes, and excise taxes. Of course, each state has its own specific tax system – some states rely heavily on sales taxes while others have no sales and/or income taxes and rely primarily on property taxes. We now consider each major tax mechanism levied in the U.S. and briefly comment on whether it is progressive or regressive.

Income Taxes (Federal and State)

The federal income tax is the most visible, complicated, and debated tax in the U.S. The federal income tax is levied on income from wages and salaries as well as income from many other sources including interest, dividends, capital gains, self-employment income, alimony, and prizes. There are two concepts one must grasp to understand the basic workings of the federal income tax.

First, not all income is taxable – taxpayers are allowed to deduct certain expenses and exemptions from their total income. Taxpayers first deduct certain out-of-pocket expenses from their total income, including individual retirement account contributions, allowable moving expenses, student loan interest, and tuition, to obtain adjusted gross income (AGI). AGI is an important metric because most of the IRS tax data are sorted by AGI. Taxpayers further deduct from AGI their deductions and exemptions.[6] Only after all these adjustments does one obtain taxable income.

The second concept is the working of marginal tax rates. Different tax rates apply on different marginal levels of income. The concept is best illustrated with an example using the 2002 tax rates. For a single filer, the first $6,000 of taxable income (not total income or AGI) is taxed at a rate of 10%. Taxable income above $6,000 but less than $27,950 is taxed at a rate of 15%. Taxable income above $27,950 but less than $67,700 is taxed at a rate of 27%. Income above $67,700 is taxed at higher marginal rates – 30%, 35%, and 38.6%. Hence, a single tax filer with $60,000 of taxable income would pay a total federal income tax of $12,546 [($6,000*0.10)+(($27,950-$6,000)*0.15)+(($60,000-$27,950)*0.27)]. Note that this equivalent to an effective tax rate of about 21% - less than the highest marginal tax rate of 27%.

Because the federal income tax excludes some income from taxation and because marginal tax rates increase with increasing income, the federal income tax is quite progressive. For example, the IRS calculates that the average effective federal income tax rate in 2000 for those tax filers with an AGI over $200,000 was about 26%. The comparable rate for those with an AGI less than $30,000 was only about 7%.[7]

[6] Note that some expenses are deducted prior to calculating AGI while the term "deduction" only applies to adjustments made after obtaining AGI. While all taxpayers get to take advantage of "deductions" by either itemizing or taking the standard deductions, not all taxpayers have expenses they can deduct prior to obtaining AGI.

[7] Values based on data extracted from Campbell and Parisi (2003), Figure B.

Forty-one states and the District of Columbia also levy an income tax.[8] Most states' income tax systems are modeled after the federal income tax – certain deductions are allowed and taxable income is taxed at increasing marginal rates. However, state income taxes tend to be much less progressive than the federal income tax. Six states have only one income tax rate, meaning that their income tax system approaches a proportional tax.[9] Several more states have what is effectively a single tax rate because the top rate applies at a very low income. For example, Maryland's top rate of 4.75% kicks in at only $3,000 of income. While the top federal marginal tax rates are over 30%, the highest marginal rate in any state is 11% (in Montana) and only eight states have top marginal rates above 7%.

Corporate Taxes (Federal and State)

Corporations must file federal tax forms that are in many ways similar to the forms individuals complete. Corporate taxable income is defined as total revenues minus the cost of goods sold, wages and salaries, depreciation, repairs, interest paid, and other deductions. Thus corporations, like individuals, can take advantage of many deductions to reduce their taxable income. Corporate tax rates, like personal income tax rates, are progressive and calculated on a marginal basis. In 2002 the lowest corporate tax rate, applied to profits lower than $50,000, was 15%. The highest corporate tax rate, applied to profits over $10 million, was 35%.[10] As with individuals, the effective tax rate that corporations pay is lower than their marginal tax rate.

All states except Nevada, Washington, and Wyoming have a state corporate income tax. Most states tax corporate income at a single rate but other states vary rates on different marginal levels of income (up to 10 brackets). State marginal corporate tax rates range from 1% to over 10%.

The progressivity of corporate taxes will be discussed in more detail later. For now, we'll just note that while corporations directly pay corporate taxes, the burden of corporate taxation ultimately falls on people. This can be in the form of higher prices to consumers, reduced capital values to owners of capital, and other market effects.

Excise Taxes (Federal and State)

An excise tax is a tax on the production, sale, or use of a particular commodity. Federal and state governments collect excise taxes from manufacturers and retailers producing or selling a surprising number of products including tires, telephone services, air travel, fossil fuels (including gasoline, diesel fuel, and aviation fuel), alcohol, tobacco, and firearms. Unlike a sales tax, which is evident as an addition to the selling price of a

[8] Two other states, Tennessee and New Hampshire, have no general state income tax but do tax dividend and interest income. The states without any income taxation are Alaska, Florida, Nevada, South Dakota, Texas, Washington, and Wyoming. Data from the Federation of Tax Administrators, www.taxadmin.org.
[9] Even with a single rate, a tax that exempts some income from taxation will still be slightly progressive regarding *effective* tax rates.
[10] The highest marginal corporate tax rate in 2002 was actually 38% but this rate applied only to profits between $15 million and $18.3 million. Profits above $18.3 million were taxed at the 35% rate.

product, excise taxes are normally incorporated into the price of a product. In most cases, consumers are not directly aware of the excise taxes they pay. For example, the federal excise tax on gasoline as of 2003 was about 18 cents per gallon.

Excise taxes are an example of a regressive tax. Lower-income households tend to spend a greater portion of their income on goods that are subject to federal excise taxes. This is particularly true for gasoline, tobacco, and alcohol products.

Estate Taxes (Federal and State)

The estate tax is applied to transfers of large estates to beneficiaries. Currently, estates valued at less than $1 million ($2 million for couples) are totally exempt from the federal estate tax. The top marginal estate tax rate is 55% but, as with individual and corporate taxes, the effective tax rates on estates tend to be lower. Provisions of the estate tax laws reduce the tax burden for the transfer of small businesses and farms.

The estate tax exemption is scheduled to increase over the next several years to $3.5 million ($7 million for couples) in 2009. In 2010, the estate tax is scheduled to expire but this expiration is only temporary – under current law the estate tax would be reinstated in 2011.

The transfer of large gifts is also subject to federal taxation. The estate tax and gift tax are complementary because the gift tax essentially prevents people from giving away their estate to beneficiaries tax-free while still alive. In 2002, gifts under $11,000 were excluded from the tax. Similar to the federal income tax, the gift tax rates are progressive and marginal, with rates that vary from 18% up to 50%. The gift tax is also schedule for temporary expiration in 2010.

The estate and gift taxes are the most progressive element of federal taxation. Estate taxes are paid exclusively by those with considerable assets. Even further, the majority of all estate taxes are paid by a very small number of wealthy taxpayers. In 2000 over half of all federal estate taxes were collected from estates worth more than $5 million, about 0.15% of all estates (Thompson, 2003).

Social Insurance Taxes (Federal)

Social insurance taxes are also known as payroll taxes or Social Security taxes. Social insurance taxes are actually two separate taxes. The first is a tax of 12.4% of wages, which is primarily used to fund Social Security. Half of this tax is deducted from an employee's paycheck while the employer is responsible for matching this contribution. The other is a tax of 2.9% for the Medicare program. Again, the employee and employer each pay half. Thus, social insurance taxes normally amount to a 7.65% deduction from an employee's wage (6.2% + 1.45%). Self-employed individuals are responsible for paying the entire share, 15.3%, themselves.

There is a very important difference between these two taxes. The Social Security tax is due only on the first $84,900 (in 2002) of income. On income above $84,900, *no* additional Social Security tax is paid. In other words, the maximum Social Security tax in 2002 that would be deducted from total wages is $5,264 ($84,900 * 0.062). The Medicare tax, however, is paid on *all* wages. Thus, the Medicare tax is truly a proportional tax while the Social Security tax is a flat tax on the first $84,900 of income but then becomes a regressive tax when we consider additional income.

Sales Taxes (State and Local)

Nearly all states (45 as of 2002) have instituted some type of general sales tax. State sales tax rates range from 2.9% (Colorado) to 7.25% (California[11]). A few states levy a lower rate on certain goods considered to be necessities, such as food and prescription drugs. For example, the general sales tax in Illinois is 6.25% but food and drug sales are taxed at only 1%. Other states with sales taxes exempt some necessities from taxation entirely. In most states, localities can charge a separate sales tax. While local sales taxes are generally lower than state sales taxes, there are exceptions. In New York the state sales tax is 4% but local sales taxes are often higher than 4%.

Sales taxes tend to be quite regressive. The reason is that low-income households tend to spend a larger share of their income on taxable items than high-income households. Consider Massachusetts – a state with a typical sales tax rate of 5%. According to the Institute on Taxation and Economic Policy (McIntyre et al., 2003), Massachusetts households in the lowest income quintile pay about 2% of their total income in state sales taxes. Meanwhile, those in the top income quintile pay only about 0.8% of their income in state sales taxes.

Property Taxes (State and Local)

Property taxes tend to be the largest revenue source for state and local governments. The primary property tax levied in the U.S. is a tax on real estate, including land, private residences, and commercial properties. Generally, the tax is an annual assessment calculated as a proportion of the value of the property, although the formulas used by localities differ significantly. Property taxes tend to be regressive, although less regressive than excise and sales taxes. The reason is that high-income households tend to have a lower proportion of their assets subjected to property taxes. While renters do not directly pay property taxes, most economists conclude that the costs of property taxes are largely passed on to renters in the form of higher rents.

Summary Data of the U.S. Tax System

Table 1 presents government tax receipts, by tax mechanism, for 1999 (the most recent year for which complete data were available). The table shows that federal taxes dominate the nation's tax system with nearly 70% of all receipts. The largest federal tax

[11] California's 7.25% sales tax rate includes a statewide local sales tax of 1.25%. The highest actual state rate is 7%, applied in Mississippi, Rhode Island, and Tennessee.

is the income tax, followed closely by social insurance taxes. State and local tax systems are primarily dependent on sales, income, and property taxation.

Table 1. 1999 Tax Receipts, by Source

Source	Amount (Millions $)	Percent of All Taxes
Federal Taxes		
Income Taxes	879,500	34.5%
Social Insurance Taxes	611,800	24.0%
Corporate Taxes	184,700	7.2%
Excise Taxes	70,400	2.8%
Estate Taxes	22,900	0.9%
Total, Federal Taxes	1,769,300	69.4%
State Taxes		
Sales Taxes	200,600	7.9%
Property Taxes	240,100	9.4%
Income Taxes	189,300	7.4%
Corporate Taxes	33,900	1.3%
Excise and Other Taxes	114,500	4.5%
Total, State Taxes	778,400	30.6%
Total, All Taxes	2,547,700	100.0%

Source: U.S. Census Bureau (2002), except for federal estate tax data from Johnson and Mikow (2002).

III. Tax Incidence

There are basically two ways to analyze the distribution of taxes. The easiest way is to measure the taxes directly paid by entities, such as households or businesses, classified according to criteria such as household income, business profit levels, etc. These data can be obtained directly from aggregate tax return data published mainly by the IRS. This approach considers only who actually pays the tax to the government. Thus, it would allocate corporate taxes to corporations, excise taxes to manufacturers, sales taxes to consumers, etc.

The second approach, called tax incidence analysis, is more complex yet more meaningful. While taxes are paid by various entities other than individuals, such as corporations, partnerships, and public service organizations, the burden of all taxes ultimately fall on individuals. The final incidence of taxation is contingent upon how a specific tax translates into changes in prices and changes in economic behavior among consumers and businesses:

> Tax incidence is the study of who bears the economic burden of a tax. More generally, it is the positive analysis of the impact of taxes on the distribution of

> welfare within a society. It begins with the very basic insight that the person who has the legal obligation to make a tax payment may not be the person whose welfare is reduced by the existence of the tax. The statutory incidence of a tax refers to the distribution of those legal tax payments – based on the statutory obligation to remit taxes to the government. …
>
> Economic incidence differs from statutory incidence because of changes in behavior and consequent changes in equilibrium prices. Consumers buy less of a taxed product, so firms produce less and buy fewer inputs – which changes the net price or return to each input. Thus the job of the incidence analyst is to determine how those other prices change, and how those price changes affect different groups of individuals. (Metcalf and Fullerton, 2002, p. 1)

Tax incidence analysis has produced a number of generally accepted conclusions regarding the burden of different tax mechanisms. Remember, for example, that the payroll tax on paper is split equally between employer and employee:

> So, who really pays the payroll tax? Is the payroll tax reflected in reduced profits for the employer or in reduced wages for the worker? ... there is generally universal agreement that the real burden of the tax falls almost entirely on the worker. Basically, an employer will only hire a worker if the cost *to the employer* of hiring that worker is no more than the value that worker can add. So, a worker is paid roughly what he or she adds to the value of production, minus the payroll tax; in effect, the whole tax is deducted from wages. ... to repeat, this is not a controversial view; it is the view of the vast majority of analysts... (Krugman, 2001, p. 43)

The most common assumption made regarding allocation of corporate taxes is that the burden of these taxes falls almost exclusively on the owners of capital. Given the mobility of capital, the burden is not limited to owners of corporate capital but extends to owners of all capital.[12] This result is primarily a theoretical finding – in reality some portion of the corporate tax burden likely falls on workers and consumers. Pechman and Okner (1974), in their dated yet thorough analysis of tax incidence, make various assumptions about the allocation of corporate taxes. If corporate taxes are allocated to corporate or capital owners, then these taxes are highly progressive. However, if 25% of corporate taxes are allocated to consumers and another 25% to workers, then the progressiveness of corporate taxes virtually disappears. Fullerton and Metcalf (2002) mention the need for empirical tests of the distribution of corporate taxes.

The distributional data presented in this paper are all based on the assumption that corporate taxes are borne generally by the owners of capital. To the extent that some portion of corporate taxes can be assigned to consumers and workers, the results below overstate the progressivity of corporate taxes.

[12] See summary in Metcalf and Fullerton (2002).

Excise taxes, although directly paid by manufacturers, are generally attributed entirely to consumers according to their consumption patterns.[13] This result is based on an assumption of perfect competition in the affected industries. Real-world markets are not, however, perfectly competitive. The actual incidence of excise taxes will depend on the degree of competition in an industry. Imperfectly competitive industries with upward-sloping supply curves imply that prices increase by less than the tax and that a portion of excise taxes are borne by businesses (and further allocated as described above for corporate taxes). Other models of imperfect competition, however, suggest that prices can increase by *more* than the tax, making excise taxes even more regressive than shown in this paper.[14]

The burden of sales taxes is generally assumed to fall directly on consumers who buy the taxed goods and services. Again, this is a simplifying assumption – in reality some portion of sales taxes filters to corporate owners, other capital owners, and workers. The data in this paper all assume that sales taxes are distributed to households based on their consumption patterns.

Personal income taxes paid by households are directly attributed to those households paying the tax. Estate tax burdens fall on the heirs paying the tax. Finally, property tax burdens are generally assumed to fall on property owners although the burden can be passed on to renters (some analysts attribute property taxes more broadly to owners of capital).

So, for several types of tax mechanisms (personal income, sales, excise, and estate taxes), data on direct tax payments is analogous to tax incidence. However, for other taxes (payroll, corporate, and to a lesser extent property taxes) the direct data on tax payments will differ from the ultimate burden of the tax.

IV. Measuring Tax Progressivity

As mentioned earlier, a tax is progressive if the tax rate increases with increasing income. Different agencies and organizations address tax progressiveness in different ways. The most common approach, used by the Congressional Budget Office and the major non-profit tax analysis organizations (Citizens for Tax Justice and the Center for Budget and Policy Priorities) is to present the effective tax rates for different income percentiles (the lowest 20%, the top 1%, etc.). For a progressive tax, effective tax rates increase moving up the income spectrum. The Joint Committee on Taxation, which provides the U.S. Congress with tax analysis, uses dollar-delineated income categories ($10,000 to $20,000 per year, $20,000 to $30,000 per year, etc.) and presents the percentage of income and taxes paid by households in each category. If the percent of taxes paid exceeds the percent of income for high-income levels, and the opposite for low-income levels, then a tax is progressive.

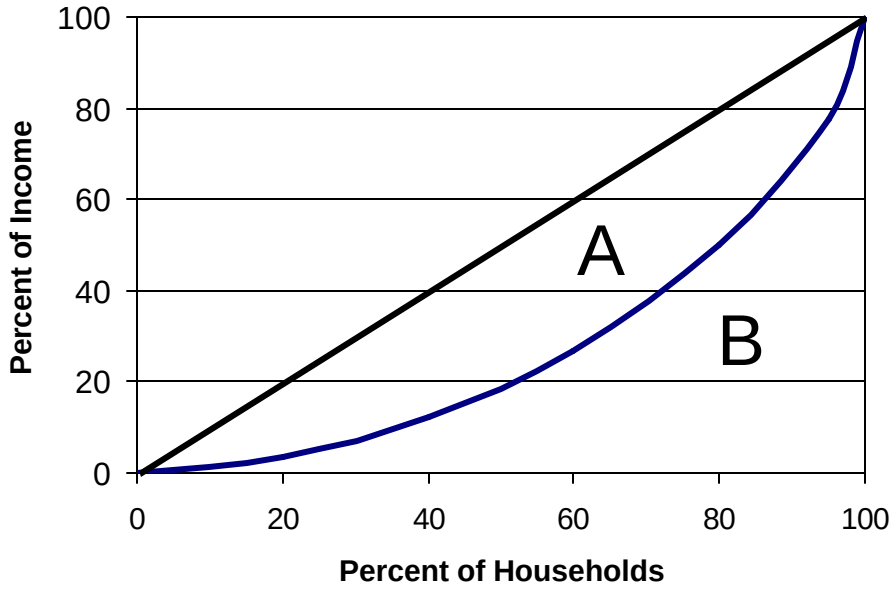
[13] See CBO (2001).
[14] See Fullerton and Metcalf (2002) for a summary of incidence assumptions and analyses for different types of taxes.

While these data can indicate whether a given tax is progressive or not, we don't necessarily know how progressive (or regressive) it is. If we want to compare two taxes to determine which is more progressive, we need a more comprehensive measure of tax progressivity. In this paper, we use the Index of Tax Progressivity (S) developed by Daniel Suits in the 1970s (Suits, 1977). Also called the Suits Index, this measure is perhaps the most widely-used metric of tax progressivity (Anderson et al., 2003). The index is based on the concept of Lorenz curves, commonly used to measure income inequality. A Lorenz curve plots the cumulative distribution of income against the ordered distribution of households. Figure 1 illustrates a Lorenz curve using the income distribution for the U.S. in 2001. The greater the distance between the curved line and the 45-degree line of perfect equality, the greater the inequality. The Gini coefficient ranges between 0 (absolute equality) and 1 (absolute inequality) and is calculated as:

Gini coefficient = Area A / (Area A + Area B)

The Gini coefficient for the U.S. in 2001 was about 0.47. The U.S. is the most economically unequal industrial country[15] Also, the Gini coefficient for the U.S. has risen significantly from around 0.40 during the 1970s.[16]

Figure 1. Lorenz Curve for U.S. Income Distribution, 2001



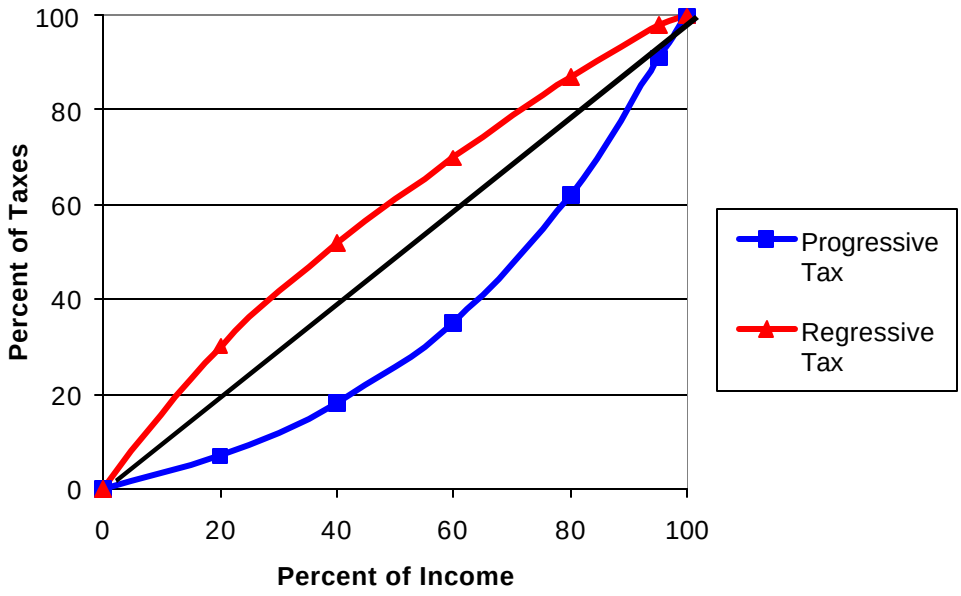
Source: U.S. Census Bureau, http://www.census.gov/hhes/income/histinc/ie1.html

[15] Based on the World Bank's 2002 World Development Indicators. The World Bank uses the Luxembourg Income Study database to measure inequality in developed countries. The World Bank's Gini coefficient for the U.S., based on 1997 data, is 0.41. The U.S. Census Bureau's 1997 estimate was 0.46. See http://www.worldbank.org/poverty/data/2_8wdi2002.pdf.

[16] U.S. Census Bureau, Historical Income Tables – Income Inequality, see http://www.census.gov/hhes/income/histinc/ie1.html.

The tax progressivity index is based on a similar graph that plots the cumulative distribution of income on the X-axis (ordered from lowest to highest) and the cumulative distribution of taxes on the Y-axis. If taxes were proportional, then the plot would a 45-degree line (those with the bottom 20% of the income pay 20% of the taxes, those with the bottom 50% of the income pay 50% of the taxes, etc.). This is shown as the black line in Figure 2.

Figure 2. Example of Tax Progressivity Curves



If a tax is progressive, then the plot will bow away from the straight line to the lower right, much as the Lorenz curve for income distribution bows away from the line of perfect equality. The curve to the lower right in Figure 2 represents a progressive tax (e.g., those with the lowest 20% of income only pay about 7% of the taxes, etc.). The curve for a regressive tax will bow away from the straight line to the upper left, as seen in Figure 2 (e.g., those with the 20% of income pay about 30% of the taxes, etc.). Unlike Lorenz curves, tax progressivity curves can be above or below the 45-degree line of tax proportionality.

The index of tax progressivity is calculated similar to a Gini coefficient. Define the triangle to the lower right of the 45-degree line as K and the area to the lower right of the tax distribution curve as L. The index is:

$$S = (K - L) / K = 1 - (L / K)$$

Unlike a Gini coefficient, S can be positive or negative, ranging from –1 to +1.[17] If a tax is proportional, then K=L and S=0. In the examples shown in Figure 2, S equals about +0.31 for the progressive tax and –0.16 for the regressive tax. In other words, the area between the red curve and the straight line is about half the area between the blue curve and the straight line. We now apply the tax progressivity index to data for the U.S.

V. Progressive and Regressive Taxes in the U.S. System

Data on the distribution of the tax burden in the U.S. comes from either government sources or non-profit organizations. No centralized government agency publishes tax distribution data for the entire U.S. tax system. The federal government agencies that publish data on tax distribution are the Internal Revenue Service (IRS), the Joint Committee on Taxation (JCT), the Congressional Budget Office (CBO), and, until recently, the Office of Tax Analysis within the U.S. Treasury.[18] The IRS data are the most detailed but focus on federal income and estate taxes. The IRS publishes data on corporate taxes but does not conduct tax incidence analyses. The JCT does conduct tax incidence analyses but only considers the federal income tax, payroll taxes, and federal excise taxes. The CBO adds the incidence of federal corporate taxes to their analyses but still omits the federal estate tax and all state and local taxes.

The primary non-profit organizations that conduct tax incidence analyses are Citizens for Tax Justice (CTJ), the Tax Policy Center (TPC), and the Center on Budget and Policy Priorities (CBPP). The TPC and CBPP focus on the distribution of federal taxes and rely primarily on the analyses of the government agencies mentioned above. The most comprehensive data on tax distribution is provided by CTJ, which conducts original tax incidence analysis for both federal and state and local taxes.

This paper uses the available data from the above organizations to estimate the tax progressivity index for each type of tax. The most recent available data are used for each estimate. The area of L is calculated using linear interpolations between each data point. Given the slightly different methodologies and reporting by different organizations, some variation in the estimates is to be expected. The raw data used to calculate values of S are presented in Appendix 1.

Table 1 presents the results of all tax progressivity index calculations. Five estimates of S are available for the federal income tax. As seen in Table 1, these estimates vary from 0.262 to 0.385, with an average of 0.334. As these values are greater than zero, the federal income tax is clearly progressive. Federal social insurance taxes, on the other hand, are clearly regressive with values of S ranging from –0.140 to –0.174. Federal excise taxes are also regressive although there is a significant difference in S derived

[17] A value of S equal to -1 implies that the entire tax burden falls on the household with the lowest income while a value of +1 puts the entire burden on the household with the highest income. Both are clearly unrealistic, especially the former.

[18] Krugman (2001) notes on page 107 that the U.S. Treasury stopped making tax distribution data available to the public once George Bush took office in 2001.

from the OTA data compare to those from the CBO and CTJ. Federal corporate taxes are progressive and once again the OTA data produces results that differ from the CBO and CTJ. The federal estate tax is highly progressive with the OTA and CTJ data producing somewhat similar values of S. State and local are slightly regressive based on the only available data (from CTJ).

Table 1. Tax Progressivity Index Estimates, by Tax Type

Tax	Estimate (S)	Year	Source
Federal Income	0.262	2000	IRS; Campbell and Parisi (2000)[19]
Federal Income	0.304	2000	OTA; Cronin (1999)
Federal Income	0.344	2001	CTJ (2002)
Federal Income	0.373	2000	CBO (2003)
Federal Income	0.385	2001	JCT (2001)
Federal Social Insurance	-0.140	2000	OTA; Cronin (1999)
Federal Social Insurance	-0.159	2001	CTJ (2002)
Federal Social Insurance	-0.174	2000	CBO (2003)
Federal Excise	-0.002	2000	OTA; Cronin (1999)
Federal Excise	-0.276	2000	CBO (2003)
Federal Excise	-0.366	2001	CTJ (2002)
Federal Corporate	0.235	2000	OTA; Cronin (1999)
Federal Corporate	0.398	2001	CTJ (2002)
Federal Corporate	0.441	2000	CBO (2003)
Federal Estate	0.711	2000	OTA; Cronin (1999)
Federal Estate	0.790	2001	CTJ (2002)
State and Local	-0.066	2002	CTJ; McIntyre, et al. (2003)
Total Federal[20]	0.168	2000	CBO (2003)
Total Federal	0.144	2001	CTJ (2002)
Total Federal	0.127	2000	OTA; Cronin (1999)
All Taxes	0.088	2001	CTJ (2002); McIntyre, et al. (2003)

The overall federal tax system is slightly progressive. The highest value of S, derived from the CBO data, excludes the federal estate tax and thus would be even higher if the estate tax were considered. The values of S produced by the OTA and CTJ data are quite similar. The only estimate of S for the entire U.S. tax system is obtained from CTJ – the value of 0.088 indicates a slightly progressive system.

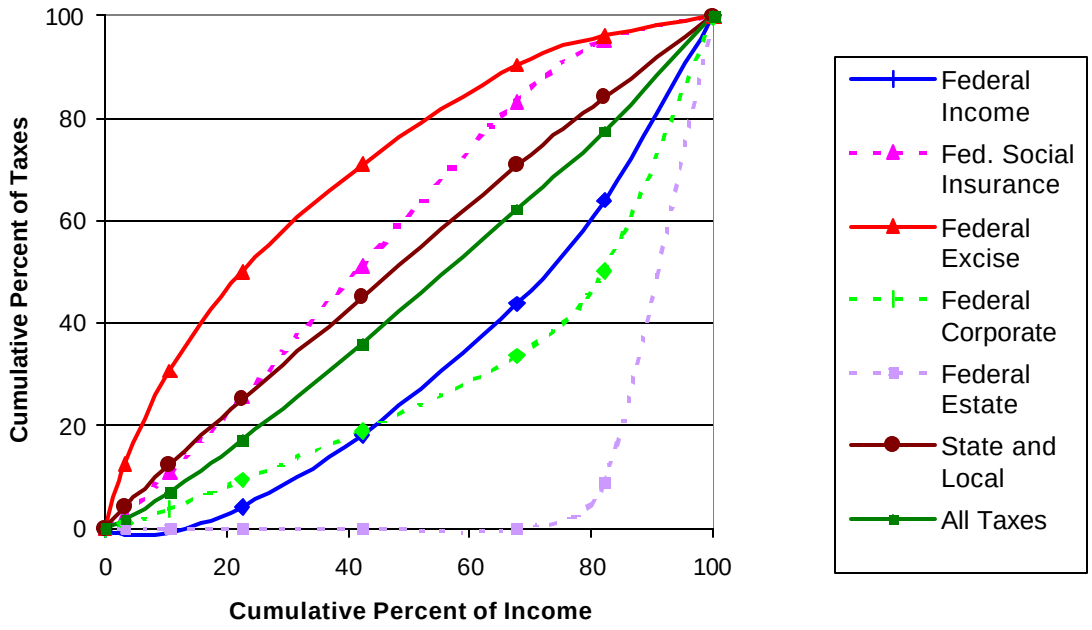
In most cases, the values of S derived from different organizations are relatively similar. The exceptions include the OTA federal excise, and to a lesser extent federal corporate, tax data. The values of S obtained from the CTJ data do not appear systematically biased from the values derived from the government agencies. For most tax types, the values of

[19] Income based on adjusted gross income from Table 1, taxes based on total tax liability from Table 2.
[20] The CBO data on total federal taxes excludes the federal estate tax.

S obtained from the CTJ data are neither the highest or lowest values. Thus, the estimate of S for the entire U.S. tax system obtained from the CTJ data appears to be a reasonable estimate.

Figure 3 presents the tax progressivity curves for each type of tax using the CTJ data, the only source with distributional data for each major tax type in the U.S. system. The most progressive tax in the system, by far, is the federal estate tax. The most regressive tax is the federal excise tax. Note that the progressivity curve for the entire U.S. tax system nearly approaches a 45-degree line indicating a proportional tax system.

Figure 3. Tax Progressivity Curves for the U.S. Tax System, 2001



Source: CTJ, 2002

VI. Past and Future Data on Tax Progressivity

This section first considers how the tax distribution of the U.S. tax system has changed in recent decades. The data in Table 1 can be compared with two sources that provide historical data. Suits (1977) provides estimates of S for different tax types for 1966 and 1970. Table 2 compares the values of S from Table 1 to the comparable values in 1966 and 1970. Several differences are evident – in particular, the federal income tax has become more progressive and federal excise taxes have become more regressive. Overall, federal taxes have become slightly more progressive, state and local taxes have gone from being slightly progressive to slightly regressive, and the overall U.S. tax system has become slightly more progressive. However, the 1966 and 1970 data are not necessarily comparable to the 2000/2001 data. The tax and income distributions were

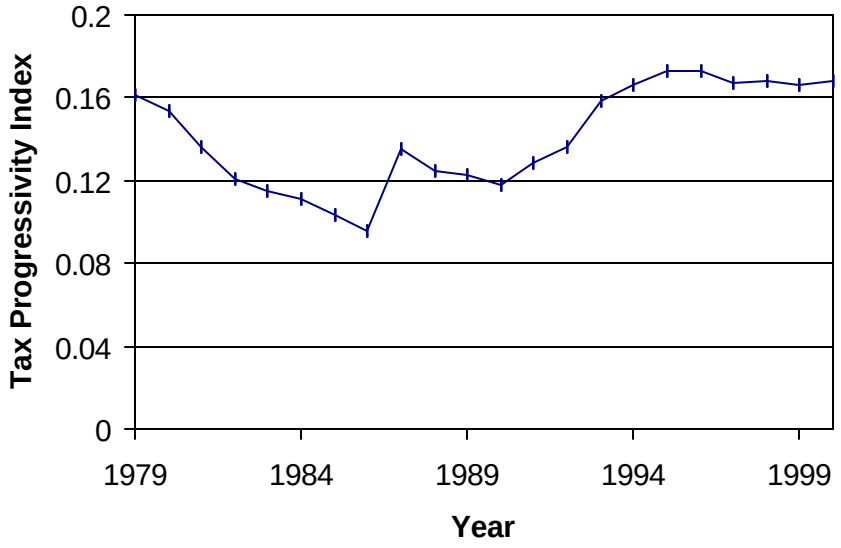
Table 2. Comparison of 1966, 1970, and 2000/2001 Tax Progressivity Indices

Tax Type	1966 (Suits, 1977)	1970 (Suits, 1977)	Average Index 2000/2001[21]	2001 (CTJ, 2002; McIntyre et al., 2003)
Federal Income	0.17	0.19	0.334	0.344
Fed. Social Insurance	-0.17	-0.13	-0.158	-0.159
Federal Excise	-0.16	-0.15	-0.215	-0.366
Federal Corporate	0.36	0.32	0.358	0.398
All Federal	0.087	0.091	0.146	0.144
State and Local	0.045	0.027	-0.066	-0.066
All Taxes	0.074	0.070	0.088	0.088

derived from different sources using different assumptions about tax incidence (e.g., the 1966 and 1970 analyses assume that some portion of corporate taxes are passed on to consumers while the more recent data do not).

The tax data published by the CBO (2003) covers the period 1979-2000. Figure 4 graphs the value of S for all federal taxes during this period. The progressivity of federal taxes declined in the early 1980s, rose sharply in 1987 (after the passage of the Tax Reform Act of 1986), remained relatively stable in the late 1980s, rose in the early 1990s (during the Bush and Clinton tax increases), and remained stable in the late 1990s. The value of S for the federal tax system in 2000 (0.168) is about the same as it was in 1979 (0.162).

Figure 4. Tax Progressivity Index, All Federal Taxes, 1979-2000



Source: CBO, 2003

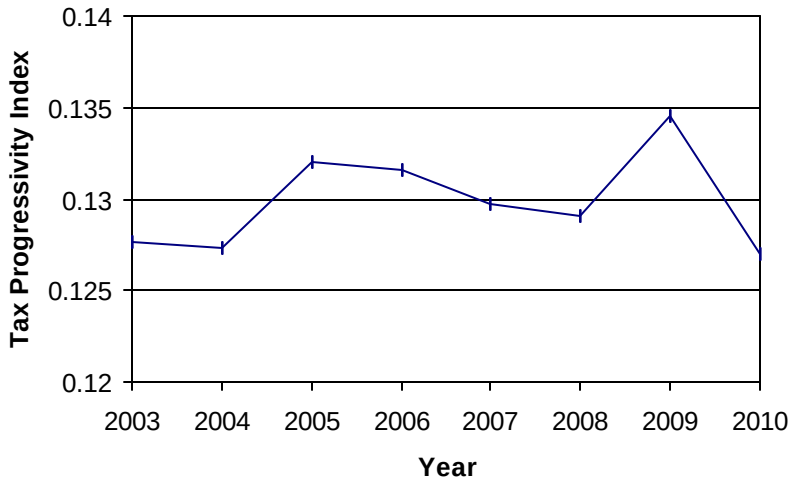
[21] Value is the unweighted average of all estimates in Table 1.

The analysis presented in Table 2 and Figure 4 suggest that, while the progressiveness of the U.S. tax system does vary over time, there has not been a significant change in tax progressivity when comparing the 2000 data to data from the 1970s.

The data in Table 1 pertain to the U.S. tax system in 2000 or 2001. Some of the data do not consider the changes of the Economic Growth and Tax Relief Reconciliation Act 2001 and none of the data include the impacts of the Jobs and Growth Tax Relief Reconciliation Act of 2003, the two major federal tax cuts passed during the Bush administration. Citizens for Tax Justice (CTJ, 2003) analyzes the impacts of these Bush tax cuts from 2003 to 2010. Their analysis assumes the various sunset provisions in the tax cut bills will be honored. Figure 5 presents the values of S for the overall federal tax system calculated from the CTJ data. The value of S remains approximately 0.13 for the duration of the period, with no obvious trend in either direction.

While Figure 5 does not show a decline in tax progressivity for the federal tax system in the coming years, note that the values for 2003-2010 are all less than the CTJ value of S of 0.144 for federal tax system in 2001. Thus, the impact of the Bush tax cuts is a slight decline in the progressiveness of the federal tax system. Another important factor is that the values in Figure 5 assume that all sunset provisions will be allowed to expire, an unlikely political outcome. CTJ also calculates the distribution of federal taxes for 2010 only assuming that the major sunset provisions will not be allowed to expire and that the federal alternative minimum tax will be fixed.[22] Under this scenario, the value of S for 2010 would be 0.089, a significant decline in the progressiveness of federal taxes.

Figure 5. Tax Progressivity Index, All Federal Taxes, 2003-2010



Source: CTJ, 2003

[22] Under the current tax code, only about 1.5% of taxpayers are subject to the federal alternative minimum tax. Without any changes, by 2010 about 15% of taxpayers would pay the AMT. Clearly, Congress will enact legislation such that the AMT does not become so widespread. (Krugman, 2001)

State and local tax systems are becoming more regressive in response to current budget crises in most U.S. state (McIntyre, 2003). States looking to close current budget deficits through revenue increases are generally raising regressive taxes, such as excise and sales taxes, rather than raising progressive taxes like income taxes (Johnson, 2002; Chaptman, 2003). No data are available on the potential overall impact of changes to state tax systems.

Thus, there is a possibility that the overall U.S. tax system could become regressive in the near future. If the value of S for the federal tax system is around 0.09 in 2010 and the state and local system remains at its 2001 level of progressivity, an approximate calculation indicates that the value of S for the entire tax system would fall to about 0.04. If we posit that state and local taxes become more regressive, the value of S for the overall U.S. tax system will become closer to zero (proportional taxation) or could even become regressive. Further changes in the federal tax code that imply reduced progressivity could also be sufficient to make the overall tax system regressive. For example, raising federal social insurance taxes, a regressive tax, as a means of meeting the revenue demands from retiring baby boomers could be sufficient to make the overall U.S. tax system regressive. A regressive overall system is also a likely outcome if the federal income tax is restructured further along the lines of the Bush tax cuts or various proposals for a "flat" federal income tax.

VII. Conclusions

Recent changes to the federal income tax should not be analyzed in isolation but rather as part of the entire U.S. tax system. The progressiveness or regressiveness of any particular tax is not nearly as important as the incidence of the entire tax system. Using the tax progressivity index, this paper shows that the U.S. tax system is composed of both progressive and regressive taxes. Overall, right now the U.S. tax system is slightly progressive. The progressiveness of the U.S. tax system in 2000 was at a similar level to that during the 1970s, although progressiveness has not remained constant and has been impacted by legislation. The recent Bush tax cuts have made the federal income tax, and thus the entire U.S. tax system, less progressive, particularly if the sunset provisions in the tax cuts are extended or made permanent. There is a possibility that even this small degree of progressiveness could be eliminated from the U.S. tax system in the future. Making state or federal social insurance taxes more regressive, or making the federal income tax less progressive, could be sufficient to make the entire U.S. tax system regressive.

This illustrates that distributional analysis of tax proposals needs to be assessed in light of the entire tax system if inequitable policies are to be avoided. In particular, claims that we are "soaking the rich," supported with data on federal income taxes, is clearly misleading. One could make a comparable claim that we are "soaking the poor" with reference to state sales taxes or federal social insurance taxes. What constitutes a fair overall tax system can not be settled by objective analysis. However, the basis for an

honest debate on tax issues must be an accurate and complete perspective on the entire U.S. tax system.

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Appendix 1. Published Data on Income and Tax Incidence Distributions

Table A1. Congressional Budget Office Income and Tax Shares, 2000

Income Category	Income Share	Total Fed. Tax Share	Fed. Income Tax Share	Fed. Social Insurance Tax Share	Fed. Corporate Tax Share	Fed. Excise Tax Share
Lowest 20%	4.0	1.1	-1.6	4.2	0.9	10.4
Second 20%	8.6	4.8	1.1	10.2	2.1	14.4
Middle 20%	13.5	9.8	5.7	16.3	5.2	18.0
Fourth 20%	19.6	17.4	13.5	25.8	8.0	21.2
Next 10%	14.2	14.5	13.5	17.7	8.3	13.6
Next 5%	9.9	10.8	11.5	11.0	8.1	8.1
Next 4%	12.9	15.8	19.7	10.3	17.4	8.7
Top 1%	17.8	25.6	36.5	4.3	49.1	5.2

Source: Congressional Budget Office, 2003

Table A2. Office of Tax Analysis Income and Tax Shares, 2000

Income Category	Income Share	Total Fed. Tax Share	Fed. Income Tax Share	Fed. Social Insurance Tax Share	Fed. Corporate Tax Share	Fed. Excise Tax Share	Fed. Estate Tax Share
Lowest 20%	2.5	0.7	-0.6	2.3	1.1	2.0	0.0
Second 20%	7.1	3.9	0.5	7.9	4.3	6.7	0.0
Middle 20%	12.5	10.2	6.9	14.9	9.2	12.8	0.0
Fourth 20%	21.2	19.9	16.3	26.4	14.9	22.1	0.8
Next 10%	16.2	16.6	15.3	20.1	11.5	16.7	3.0
Next 5%	11.0	12.0	12.2	12.8	9.4	11.2	5.2
Next 4%	14.6	16.4	19.6	11.4	19.4	14.5	26.8
Top 1%	14.8	20.1	29.5	4.0	30.3	13.9	64.2

Source: Cronin, 1999

Table A3. Internal Revenue Service Income and Tax Shares, 2000

AGI Category	Percent of Returns	Income Share	Fed. Income Tax Share
Less than $1	0.9	-0.9	0.0
$1 - $5,000	9.9	0.5	0.1
$5,000 - $10,000	9.9	1.5	0.3
$10,000 - $15,000	9.4	2.4	0.6
$15,000 - $20,000	9.0	3.2	1.0
$20,000 - $25,000	7.7	3.5	1.4
$25,000 - $30,000	6.5	3.6	1.8
$30,000 - $40,000	10.5	7.4	4.2
$40,000 - $50,000	8.1	7.3	4.8
$50,000 - $75,000	13.2	16.4	12.0
$75,000 - $100,000	6.7	11.6	10.2
$100,000 - $200,000	6.3	16.7	18.8
$200,000 - $500,000	1.7	9.6	14.8
$500,000 - $1,000,000	0.3	4.2	7.6
$1,000,000 - $1,500,000	0.08	1.9	3.5
$1,500,000 - $2,000,000	0.03	1.2	2.2
$2,000,000 - $5,000,000	0.05	3.1	5.8
$5,000,000 - $10,000,000	0.01	1.9	3.4
More than $10,000,000	0.01	4.7	7.5

Source: Campbell and Parisi, 2002

Table A4. Joint Committee on Taxation Income and Tax Shares, 2001

AGI Category	Percent of Returns	Income Share	Total Federal Tax Share[23]	Fed. Income Tax Share
Less than $10,000	14.0	1.0	0.4	-0.7
$10,000 - $20,000	16.4	4.2	1.4	-1.3
$20,000 - $30,000	13.0	5.6	3.3	0.4
$30,000 - $40,000	11.1	6.7	4.9	2.4
$40,000 - $50,000	9.2	7.2	5.7	3.5
$50,000 - $75,000	15.4	16.4	14.4	10.6
$75,000 - $100,000	9.1	13.7	13.9	11.6
$100,000 - $200,000	9.0	20.6	23.5	23.9
More than $200,000	2.7	24.5	32.4	49.7

Source: Joint Committee on Taxation, 2001

Table A5. Citizens for Tax Justice Income and Tax Shares, 2001[24]

Income Category	Income Share	Total Fed. Tax Share	Fed. Income Tax Share	Fed. Social Insurance Tax Share	Fed. Corporate Tax Share	Fed. Excise Tax Share	Fed. Estate Tax Share	State & Local Tax Share
Lowest 20%	3.3	1.1	-1.1	2.9	0.9	12.5	0.0	4.3
Second 20%	7.3	4.0	0.3	8.2	2.9	17.6	0.0	8.3
Middle 20%	12.1	9.1	5.1	14.6	5.8	18.8	0.0	12.7
Fourth 20%	19.7	17.9	14.0	25.7	9.5	20.1	0.0	19.9
Next 15%	25.4	26.5	25.6	32.0	14.6	19.7	0.0	25.7
Next 4%	14.3	16.1	20.1	12.0	16.4	4.2	9.0	13.2
Top 1%	18.1	25.1	36.9	4.6	49.6	3.5	91.0	15.9

Sources: Citizens for Tax Justice, 2002; Citizens for Tax Justice, 2003

[23] Includes federal income, social insurance, and excise taxes. Excludes federal corporate and estate taxes.
[24] State and local tax share data for 2002.

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