



**KENNESAW STATE
UNIVERSITY**

COLES COLLEGE OF BUSINESS
*Bagwell Center for the Study of Markets
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Commentary

Title:

"Not Death, but the Other Thing"

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For decades, there has been a general consensus among Americans that “the rich” don’t pay their “fair-share” in taxes. In an April 2019 Gallup poll, 62% of respondents said that “upper-income people” are paying “too little” in Federal Income Taxes, while 81% said that “lower-income people” are paying either “too much” or their “fair share.”¹ Placating this populist position, politicians such as Bernie Sanders, Elizabeth Warren, and Alexandria Ocasio-Cortez have all been quite vocal in advocating for drastically increasing taxes on “the rich.”

Recognize that there cannot be an objective answer to any question along the lines of “Does ‘group X’ pay its ‘fair share’ of taxes?,” since by its very nature such a question is subjective. Any person’s answer to such a question is based upon his own personal value judgements, assessment of fairness, and notions of equity. This being said, we can still attempt to objectively measure how the burden of a tax is distributed over different segments of society in order to have a fact-based informed opinion about the fairness or lack of fairness in our tax system.

One of the most commonly applied notions of tax equity is vertical equity, which states that for a tax to be fair people with greater economic capacity should have greater tax burdens. This sounds like something that every reasonable person would agree with, so why doesn’t it settle the issue? Once we begin to apply this notion of fairness we see where difficulties and disagreements can arise. What does economic capacity mean – should it simply be measured by income? Likewise, how should tax burden be measured – should it be equal to dollars paid in taxes or perhaps percentage of income paid in taxes?

If we take the positions that economic capacity should be measured by income and tax burden should be measured by percentage of income paid in taxes, then the notion of vertical equity would begin to give us an argument in favor of what are called progressive taxes. Used in this manner, progressive does not mean politically progressive, but rather mathematically progressive.

Even if everyone were to agree that taxes should be progressive, how progressive should taxes be? Consider a simple example. Suppose Ann earns \$100,000 of income and has to pay \$15,000 in income taxes, which is 15% of her salary. If Beth earns \$200,000 of income her tax bill must be more than \$30,000 (i.e., more than 15% of her salary) for vertical equity to *not* be violated. But would fairness dictate that she pay \$32,000 or \$48,000 or \$64,000 in taxes?

The U.S. Federal Income Tax is – and has been since its inception – a progressive tax. Higher income individuals not only pay more dollars in income taxes, they pay a greater percentage of their income in taxes than do lower income individuals. But is it possible to measure “how progressive” the U.S. Federal Income Tax is? If we try to do so, we will essentially be trying to measure how equal or unequal tax payments are for different segments of society.

The most accepted (by economists) and insightful approach to measuring inequality is based upon the concepts of Lorenz Curve and Gini Coefficient, which were first developed to assess income inequality. Thinking about the distribution of incomes, first conceptually order everyone in society from lowest income to highest income. Then, focusing on an arbitrary percentage of the individuals with lowest incomes, we could determine the percentage of total societal income earned by these people. Doing this over all possible groups of people would sketch out a curve that looks something like that depicted in Figure 1.

This curve, known as a Lorenz Curve, must mathematically satisfy several properties – it must pass through the points (0,0) and (1,1); it must be upward sloping; it must get steeper as we move up the curve; and (so long as there are any differences in incomes) it must lie below the “45

¹ See <https://news.gallup.com/poll/1714/taxes.aspx>.

degree line.” This final observation can be understood by recognizing that the Lorenz Curve would exactly coincide with the “45 degree line” or “Line of Perfect Equality” if everyone had the same exact income. At the other extreme, if only one person had any income (and everyone else in society had zero income), then the Lorenz Curve would be a “reverse-L,” passing through the points (0,0), (1,0), and (1,1). Looking at Figure 1, the Lorenz Curve will divide the “unit triangle” (i.e., a triangle with base of 1 and height of 1, which has an area of $\frac{1}{2}$) into Area *A* and Area *B*.

The Gini Coefficient is a simple summary statistic measuring overall income inequality, defined as “Area *A* divided by Areas *A+B*” (or equivalently, “2 times Area *A*”). The Gini Coefficient can mathematically range between a value of 0 (when there is no inequality and the Lorenz Curve coincides with the 45 degree line) and a value of 1 (when only one person earns all income and the Lorenz Curve is a “reverse L”), with a larger value revealing greater income inequality. The Gini Coefficient is telling us the percentage of the unit triangle that is covered by Area *A* – that is, for a fixed amount of income the Gini Coefficient is revealing how much income inequality we actually have as a percentage of the maximum possible amount of income inequality that we could have.

Shifting attention to tax burdens, focus on a particular tax and sketch out a similar Tax Concentration Curve, which illustrates fraction of total tax dollars paid by each cumulative fraction of people ordered from lowest income to highest. Doing this for a progressive tax (for which higher income people pay a great percentage of their income in taxes) gives a Tax Concentration Curve similar to the one illustrated in Figure 2 (i.e., for a progressive tax the Tax Concentration Curve must lie below the Lorenz Curve). Notice that the Tax Concentration Curve divides what was Area *B* in Figure 1 into two areas (labelled Area *C* and Area *D* in Figure 2).

If we instead had a proportional tax in which all people paid the exact same percentage of their income in taxes, then the Tax Concentration Curve would exactly coincide with the Lorenz Curve (Area *C* would vanish and Area *D* would coincide with Area *B*). At the other extreme, if tax revenues were extracted only from the highest income earner, then the Tax Concentration Curve would be a “reverse L” (in which case Area *D* would vanish and Area *C* would coincide with Area *B*).

How progressive is a tax? That is, to what degree is the burden of a tax borne by high income earners? We can quantify the degree of progressivity of a tax by the Stroup Coefficient of Tax Progressivity, defined as “Area *C* divided by Areas *C+D*.” The Stroup Coefficient can mathematically range between a value of 0 (when the tax is proportional and the Tax Concentration Curve coincides with the Lorenz Curve) and a value of 1 (when the tax is imposed on only the highest income earner and the Tax Concentration Curve is a “reverse L”). A larger value reveals that the degree of progressivity of the tax is greater, in that the burden of paying the tax is falling upon higher income earners to a greater degree. The Stroup Coefficient is equal to the percentage of the area below the Lorenz Curve that is covered by Area *C* – that is, for a fixed amount and distribution of income, the Stroup Coefficient is revealing the degree to which the burden of paying the tax is concentrated on higher income earners, as a percentage of having only the very highest income earner in society bear the entire tax burden.

Using data from the IRS’s Statistics of Income reports, it is possible to estimate a Lorenz Curve, Tax Concentration Curve, and value of the Stroup Coefficient of Tax Progressivity over the entire adult population for the U.S. Federal Income in every year from 1929 through 2018. The resulting values of the Stroup Coefficient from this exercise are plotted in Figure 3. Over this time the value of the Stroup Coefficient ranged from a low of .445 (in 1969) to a high of .9980 (in 1929). The index value was .985 or higher (recall that, mathematically, the maximum value is 1)

in every single year between 1929 and 1939, when the Federal Income Tax was still a tax on the very elite as opposed to a tax on the masses. Between 1929 and 2018, the mean (i.e., average) index value was .635 and the median (i.e., middle) index value was .584.

A visual inspection of Figure 13.2 reveals that since realizing its low value of .445 in 1969 there has been a consistent and steady increase in the degree of tax progressivity. The value has been above .7 in all 11 years from 2008 through 2018 (the value in 2018 was .726). In contrast, the value was below .7 for all 66 years from 1942 through 2007. That is, the U.S. Federal Income Tax has been more progressive since 2008 than it was over the six and a half decades before that year.

These facts are all the more interesting if we focus in greater detail on Gallup poll results. The public's assessment of whether or not the "rich" pay their "fair share" of taxes has been fairly stable since 1994. In every year in which Gallup has asked this question since 1994, between 55% and 68% of respondents have said that "upper-income people" are paying "too little" in Federal Income Taxes. Similarly, since 1992 the percentage of respondents who said that "lower-income people" are paying either "too much" or their "fair share" of income taxes ranged between 73% and 89%.²

While the public's perception of whether or not different segments of society are paying their "fair share" of taxes has not changed much in recent decades, as we've seen the degree of progressivity of the U.S. Federal Income tax has actually changed. In 1994 the value of the Stroup Coefficient was .620. At that time, 68% of respondents said that "upper-income people" are paying "too little" in Federal Income Taxes and 85% said "lower-income people" are paying either "too much" or their "fair share." By 2018 there was a significant increase in the value of the Stroup Coefficient (to a value of .726), yet the views of the public on the fairness of the tax didn't change much at all (68% had dropped to 62%, and 85% had dropped to 81%). So, either the public's fundamental subjective views of tax fairness changed over these years (which is entirely possible) or (in my opinion more likely) the public is simply unaware of the fact that the U.S. Federal Income Tax has become more progressive, with the burden of the tax falling more heavily on high income earners, over the last several decades.

² Again, see <https://news.gallup.com/poll/1714/taxes.aspx>.

Figure 1 – Lorenz Curve and Gini Coefficient

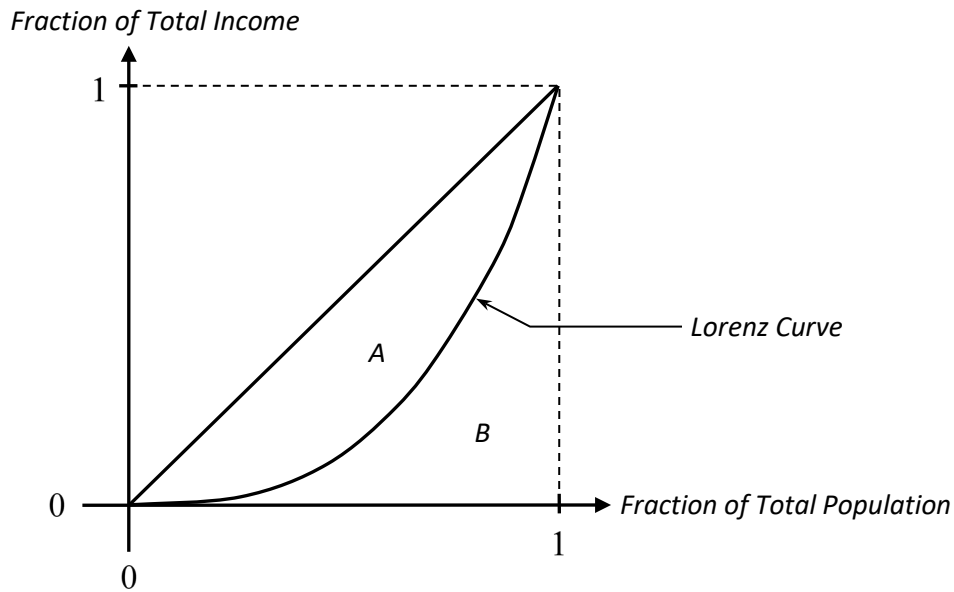


Figure 2 – Tax Concentration Curve and Stroup Coefficient of Tax Progressivity

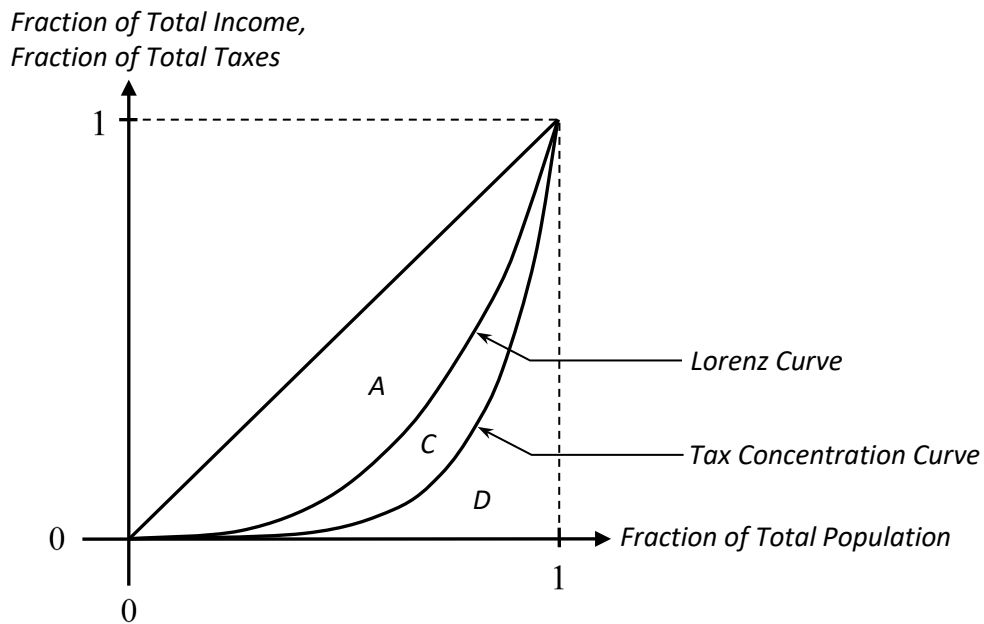


Figure 3 – Stroup Coefficient of Tax Progressivity for the U.S. Federal Income Tax

