

## **Louisiana Distribution of Income – Lorenz Curve (as measured by FAGI, Tax Year 2004)**

An accompanying graph depicts the distribution of income in the state, as measured by federal adjusted gross income for tax year 2004. Income distribution is depicted here through a Lorenz Curve<sup>1</sup>, a common tool for picturing the overall observed distribution of income relative to a theoretical absolute of perfectly equal income distribution. In this type of depiction the diagonal represents absolute or perfectly equal income distribution. All along the diagonal the cumulative percentage of tax returns<sup>2</sup> (measured along the horizontal axis) is exactly the same as the cumulative percentage of income<sup>3</sup> (measured along the vertical axis). The curved line is the observed cumulative distribution of income reflected in Louisiana tax returns for the 2004 tax year. All along a curved line that lies below the diagonal the cumulative percentage of income will be less than the cumulative percentage of tax returns. For example, 25% of returns would reflect 25% of the income if income were equally distributed. However, we actually observe that the lowest 25% of the returns reflect only about 4% of the income<sup>4</sup>. In the graph, this observed inequality of income distribution is described at various points along the curved line from the perspective of the bottom cumulative percentage of returns and the corresponding highest cumulative percentage of returns.

A similar graph is provided for the United States as a whole. While difficult to see visually, the U.S. graph depicts a somewhat more unequal distribution of income than in Louisiana. The two distributions can be readily compared by calculating the Gini coefficient<sup>5</sup> for each; the ratio of the area between the diagonal and observed curved line to the entire area beneath the diagonal. The Gini coefficient summarizes the entire Lorenz Curve into a single value. In effect, the graphs show that observed inequality of income distribution in the state is 54% of perfect income inequality, while the U.S. graph shows that observed inequality of income distribution in the nation is 57.47% of perfect income inequality<sup>6</sup>. Based on these depictions and calculations, Louisiana is similar to the nation as a whole in its distribution of income (and may even be slightly more equal than the nation).<sup>7</sup>

A significant qualification to this analysis should be made here. The true degree of income inequality in the state and the nation is actually less than indicated here. Broader concepts of income used by specialists in the field result in actual U.S. Gini coefficient estimates of around 0.45 rather than the 0.57 calculated here; about a 20% smaller coefficient. A true Louisiana coefficient would likely be similarly smaller than indicated here, as well. Thus, income inequality in the nation and the state are more like 45% and 42% of perfect income inequality, respectively. Also, for a technical reason, the Louisiana Gini coefficient is likely to be slightly farther below the U.S. coefficient than the 3.5 percentage points calculated in this analysis. Thus, the Louisiana income distribution is probably a little more equal, compared to the U.S. as a whole, than indicated by this analysis. However, this effect appears to be very small and not material to the results of the analysis<sup>8</sup>.

---

<sup>1</sup> Developed by the American economist Max Otto Lorenz in 1905.

<sup>2</sup> Each tax return can be a reasonable proxy for a household, and the number of resident tax returns reflected in this analysis (1,590,082) is about 93% of the total number of households in the state estimated by the U.S. Census Bureau for 2004 (1,713,680).

<sup>3</sup> The income concept employed here is federal adjusted gross income (FAGI). This concept is narrower than what would be employed by specialists in income distribution, but is readily available from the Legislative Fiscal Office personal income tax simulation model.

<sup>4</sup> The farther out to the right the curved line occurs the more unequal is the distribution of income. Perfectly unequal income distribution would be depicted by an observed line running straight along the bottom horizontal axis and straight up the right vertical axis. Only one tax return would have all the FAGI.

<sup>5</sup> Developed by the Italian statistician Corrado Gini in 1912.

<sup>6</sup> The farther out to the right the curved line occurs the closer to 1.0 is the Gini coefficient; the more the area between the diagonal and the observed curved line becomes the entire area under the diagonal; the more the observed line becomes a straight line along the bottom axis and up the right axis; the more the observed distribution approaches perfect income inequality.

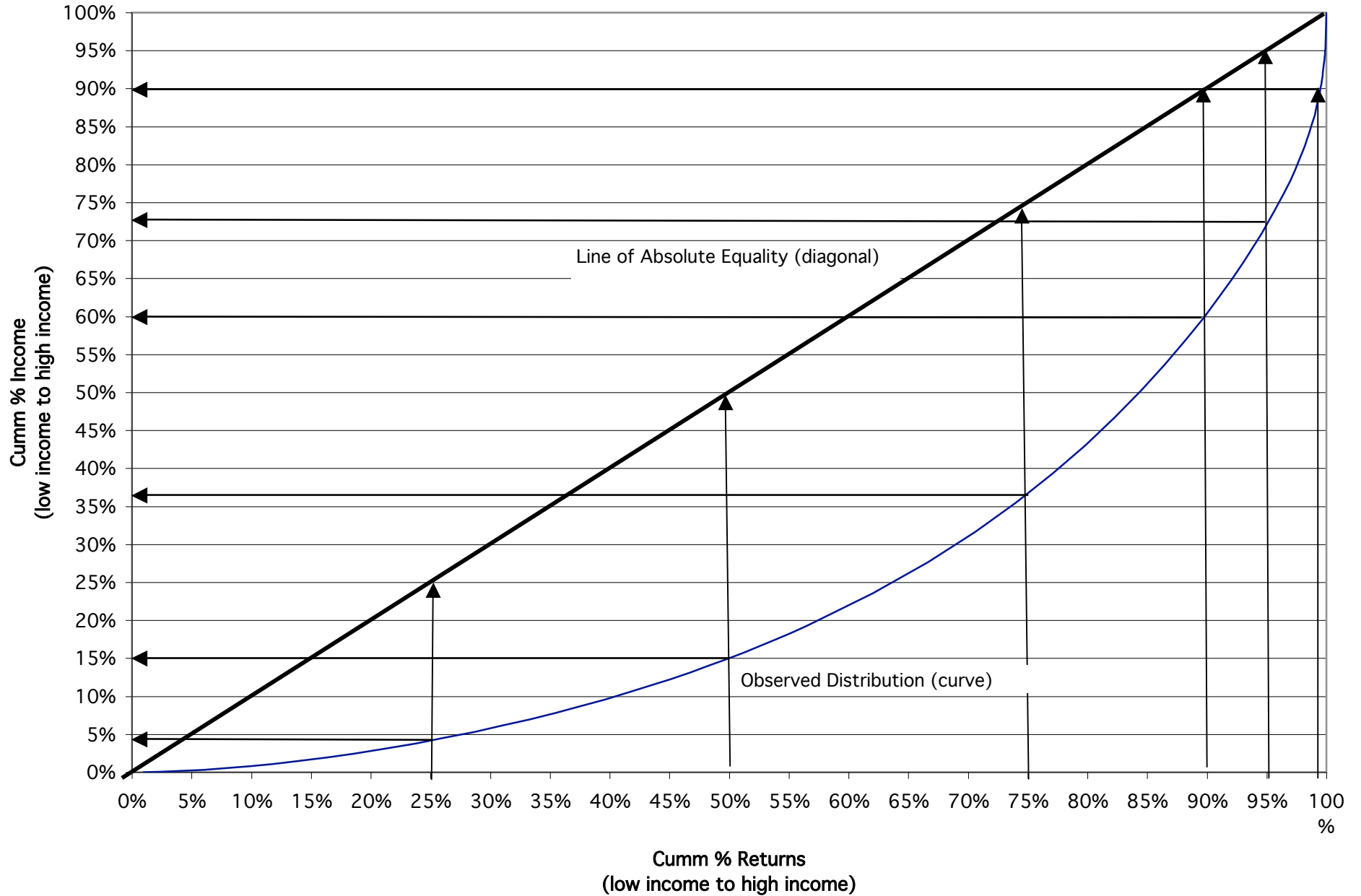
<sup>7</sup> Some of this difference in coefficients is due to the fact that Gini coefficients for larger more diverse areas (such as the U.S. as a whole) tend to be larger than those for smaller less diverse areas or sub-regions (such as Louisiana).

<sup>8</sup> The two sets of data have differences in their granularity, where each combination of cumulative returns and cumulative income is a grain of data. While neither calculation utilizes as many data points or grains as would be used by specialist in the field, this analysis utilized over four times more for the Louisiana calculation as for the U.S. calculation. This occurs simply because more Louisiana-specific data is readily available than U.S.-specific data. The more data points available to the calculation the greater the Gini coefficient tends to be. This effect was tested by calculating the Louisiana coefficient with the same number of grains of data used to calculate the U.S. coefficient. On this basis, the Louisiana coefficient would be only about 1/10 of 1% lower than calculated in this analysis.

- a) bottom 25% of returns w/ 4% of income; top 75% of returns w/ 96% of income
- b) bottom 50% of returns w/ 15% of income; top 50% of returns w/ 85% of income
- c) bottom 75% of returns w/ 37% of income; top 25% of returns w/ 63% of income
- d) bottom 90% of returns w/ 60% of income; top 10% of returns w/ 40% of income
- e) bottom 95% of returns w/ 71% of income; top 5% of returns w/ 29% of income
- f) bottom 99% of returns w/ 90% of income; top 1% of returns w/ 10% of income

## LA Distribution of Income Lorenz Curve (as measured by FAGI, Tax Year 2004)

Gini coefficient = .5400



- a) bottom 25% of returns w/ 3% of income; top 75% of returns w/ 97% of income
- b) bottom 50% of returns w/ 13% of income; top 50% of returns w/ 87% of income
- c) bottom 75% of returns w/ 34% of income; top 25% of returns w/ 66% of income
- d) bottom 90% of returns w/ 55% of income; top 10% of returns w/ 45% of income
- e) bottom 95% of returns w/ 67% of income; top 5% of returns w/ 33% of income
- f) bottom 99% of returns w/ 85% of income; top 1% of returns w/ 15% of income

## U.S. Distribution of Income Lorenz Curve (as measured by FGI, Tax Year 2004)

Gini coefficient = .5747

