

Learn to Create a Lorenz Curve in Excel: Visualizing Income Inequality

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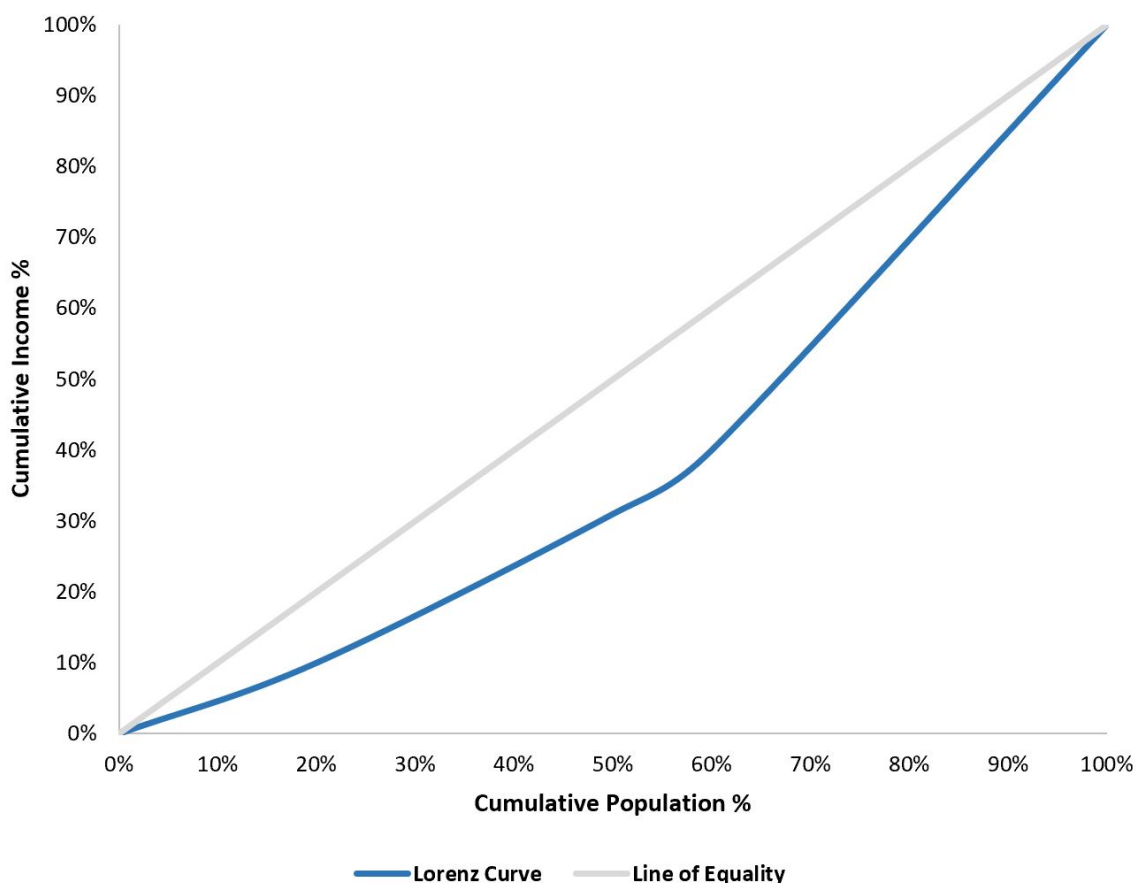
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The [Lorenz curve](#), conceived by American economist Max O. Lorenz, stands as an essential graphical tool for illustrating the disparity in wealth or [income distribution](#) across a given [population](#). Its primary function is to offer immediate, clear visual insights into the extent of economic inequality present within any specified society or financial system.

Mastering the creation and interpretation of the Lorenz curve is a foundational competency for professionals in economics, sociology, and statistical analysis, particularly those focused on [data visualization](#). This extensive guide provides a detailed walkthrough of the entire construction process, utilizing [Microsoft Excel](#)--a highly accessible and universally used spreadsheet application--to generate accurate and compelling visualizations.

Upon completing this step-by-step tutorial, you will possess the ability to produce a sophisticated and informative Lorenz curve, mirroring the quality of the example displayed below, thereby significantly enhancing your capacity to analyze and present complex distribution data effectively.



We now proceed to the underlying concepts and practical implementation.

The Fundamental Concept of the Lorenz Curve

At its core, the Lorenz curve is a cumulative plot: it maps the cumulative percentage of total income (on the Y-axis) against the cumulative percentage of the population (on the X-axis), typically ordered from the poorest to the wealthiest segments. This structure allows for a meaningful representation of how wealth is concentrated or dispersed.

The theoretical benchmark for perfect equality is vital to understanding the curve. If resources were distributed perfectly equally, the bottom X percent of the population would hold precisely X percent of the total income. This ideal scenario is graphically represented by a straight, 45-degree diagonal line extending from the origin (0,0) to the point (100, 100). This critical reference is known as the [line of equality](#).

In reality, the plotted Lorenz curve almost always dips below this line of equality, reflecting the inherent disparities in income distribution. The extent to which the curve "sags" away from the perfect equality line directly corresponds to the degree of inequality present. A greater distance signifies more extreme concentration of wealth among a smaller portion of the [population](#). This visual metaphor is incredibly powerful, transforming abstract statistics into clear economic insight.

Furthermore, the area enclosed between the Lorenz curve and the line of equality is mathematically significant. This area is used in the calculation of the [Gini coefficient](#), a common scalar measure of inequality that ranges from 0 (perfect equality) to 1 (perfect inequality). Although this tutorial focuses on the visual construction process in [Microsoft Excel](#), grasping this conceptual framework ensures that the resulting visualization is interpreted with accurate economic context.

Step 1: Preparing and Structuring Distribution Data in Excel

The accuracy of your final Lorenz curve depends entirely on the meticulous preparation of your input data. The fundamental requirement is to calculate and present cumulative percentages. You must establish two primary columns in your [Microsoft Excel](#) spreadsheet: one for the **cumulative percentage of the population** and another for the **cumulative percentage of income** (or wealth) that corresponds to that population segment. Ensure your data is ordered sequentially, starting from the lowest income earners upwards.

For demonstration purposes, we will utilize a practical dataset representing the [income distribution](#) of a hypothetical national economy. Enter the following structured data into your spreadsheet to proceed with the example:

	A	B	C	D
1	Cumulative Population %	Cumulative Income %		
2	0%	0%		
3	20%	10%		
4	50%	31%		
5	60%	40%		
6	100%	100%		
7				
8				
9				
10				
11				
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Analyzing this table reveals crucial data points about the wealth distribution:

The bottom **20%** of individuals collectively account for only **10%** of the total income.

The bottom **50%** of the population holds merely **31%** of the total income.

The bottom **60%** of individuals possess **40%** of the total income.

The data must culminate at the anchor point where **100%** of the **population** holds **100%** of the total income, which is necessary for closing the curve.

Following the preparation of the actual distribution data, you must establish the data points for the **line of equality**. This is simpler, as it involves creating a series that perfectly mirrors the X and Y coordinates, representing the hypothetical scenario where income is perfectly equal. Create a new set of columns ranging from 0% to 100% in consistent increments (e.g., 0%, 20%, 40%, etc.).

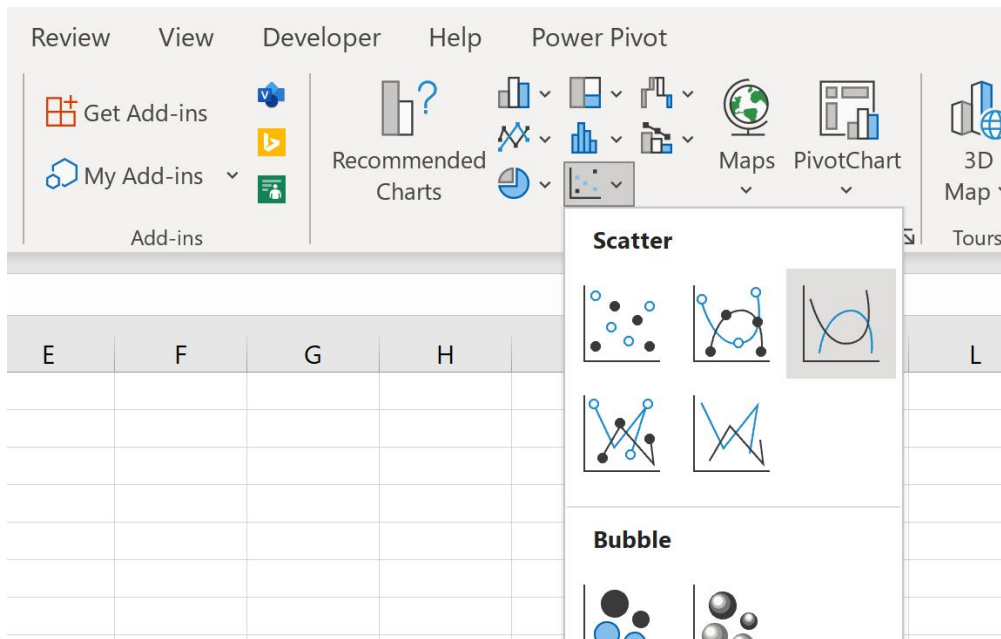
	A	B	C	D	E
1	Cumulative Population %	Cumulative Income %	x	y	
2	0%	0%	0%	0%	
3	20%	10%	10%	10%	
4	50%	31%	20%	20%	
5	60%	40%	30%	30%	
6	100%	100%	40%	40%	
7			50%	50%	
8			60%	60%	
9			70%	70%	
10			80%	80%	
11			90%	90%	
12			100%	100%	
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This equality dataset is paramount, as it acts as the essential visual benchmark against which the actual distribution curve will be plotted and compared, enabling the viewer to instantly measure the degree of economic disparity.

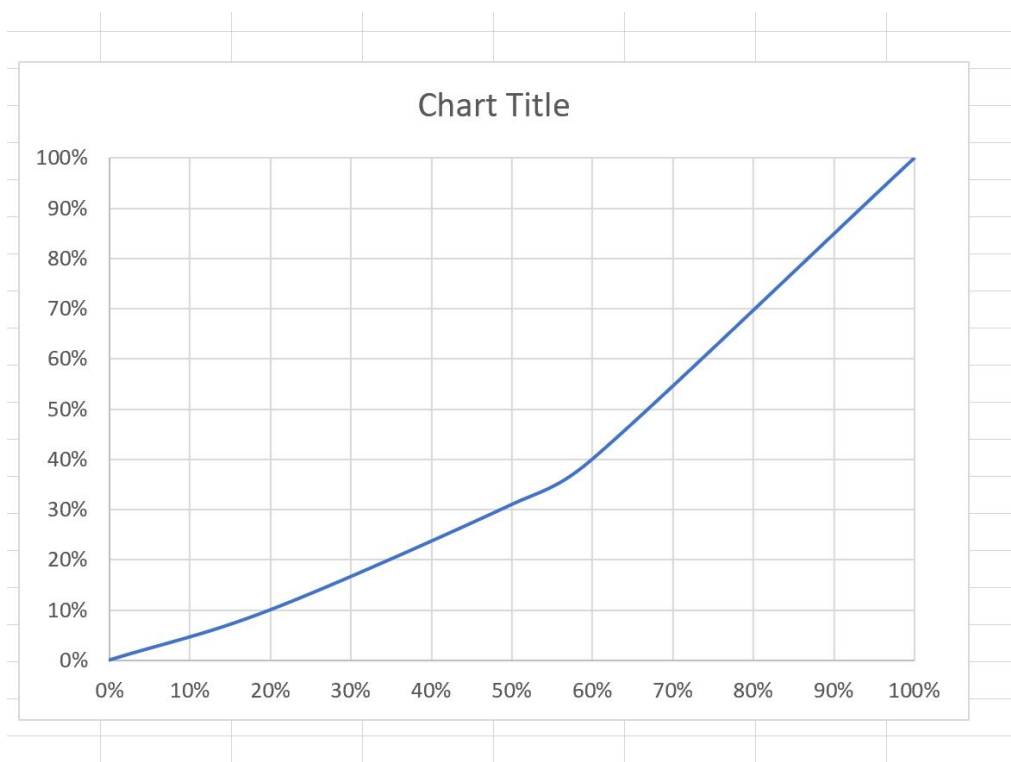
Step 2: Generating the Initial Distribution Plot

Once your data tables are correctly structured in [Microsoft Excel](#), the next objective is to generate the foundational graph using the actual cumulative distribution figures. This graph will initially plot the empirical Lorenz curve before the equality line is added. Begin by selecting the range of cells that contain your cumulative population and cumulative income data (in our example, this corresponds to cells **A2:B6**).

With the data highlighted, navigate to the **Insert** tab on the Excel ribbon. Locate the **Charts** group and specifically choose the **Scatter** chart type. Within the scatter options, select **Scatter with Smooth Lines**. This choice is optimal for visualizing the continuous nature of cumulative data and ensuring the resulting curve is visually smooth and professional.



Upon execution, [Microsoft Excel](#) will immediately render a basic [scatter plot](#). This initial visualization effectively maps the relationship between the cumulative percentage of the population and the cumulative income they possess. This curved line represents the actual [income distribution](#) for the dataset.

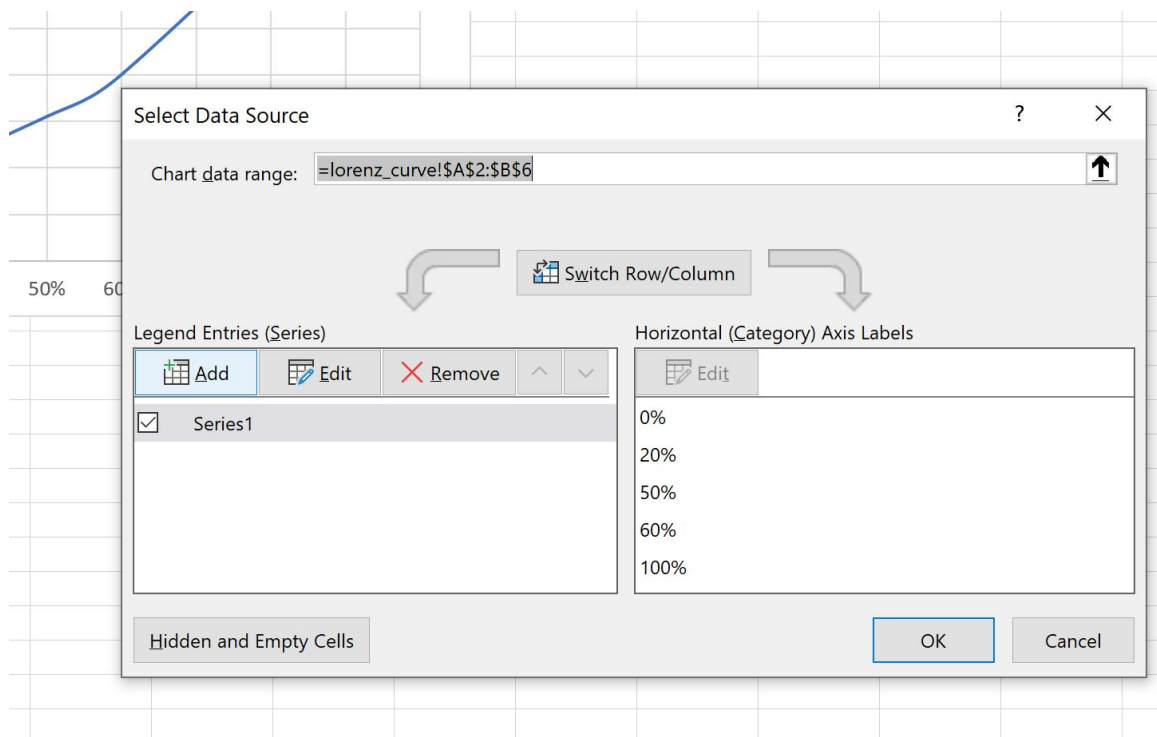


While this output accurately displays the distribution curve, it lacks the necessary context for interpretation. The subsequent crucial phase involves incorporating the comparative benchmark to fully leverage the analytical power of the Lorenz representation.

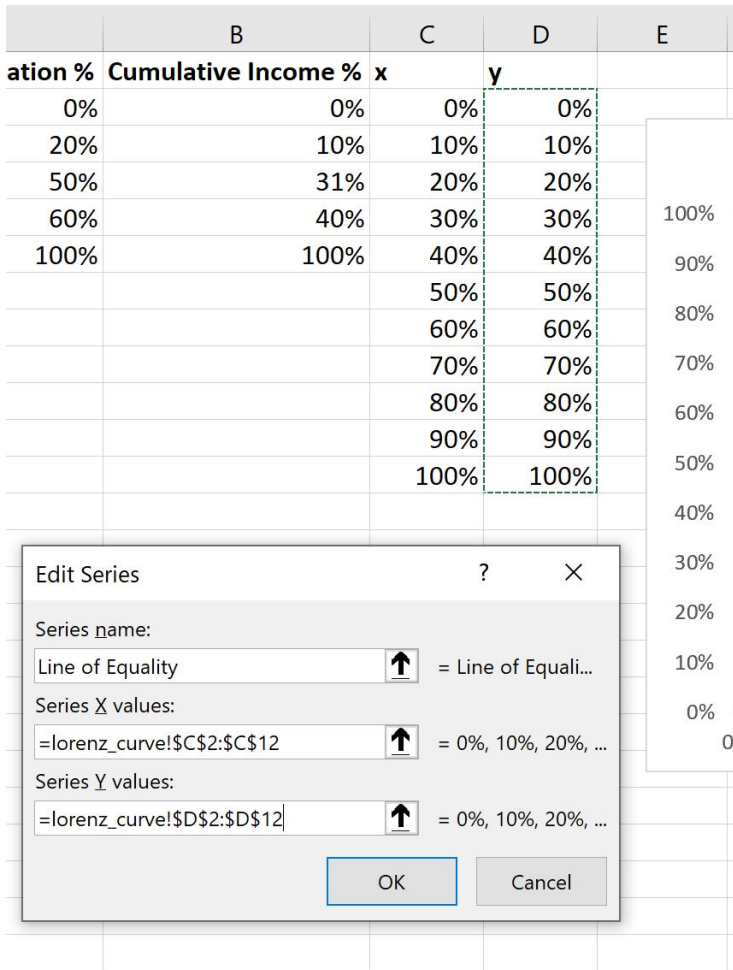
Step 3: Integrating the Line of Equality Benchmark

To provide context and enable the quantification of inequality, you must now superimpose the [line of equality](#) onto your existing [chart](#). This addition transforms the distribution curve into a true Lorenz curve, offering a direct comparison against the perfect 45-degree distribution line.

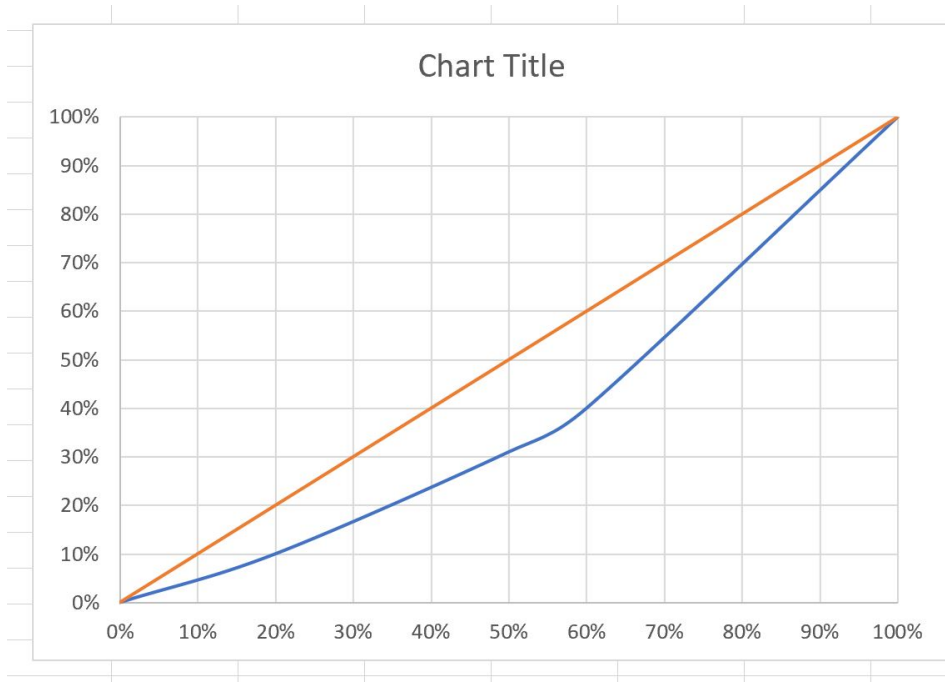
To begin adding this new data series, right-click anywhere within the newly created chart area. A contextual menu will appear; select the **Select Data** option. This command opens the "Select Data Source" dialog box, which is used to manage all data series currently displayed in your plot.



Within the "Select Data Source" window, click the **Add** button to introduce the new series. Name this series clearly, perhaps "Line of Equality." Crucially, define the series values precisely: for the "Series X values," select the cells containing the cumulative population data for equality (e.g., **C2:C7**). For the "Series Y values," select the corresponding cumulative income data for equality (e.g., **D2:D7**).



Confirm your selections by clicking **OK** in both the "Edit Series" and "Select Data Source" dialog boxes. The diagonal line representing perfect distribution will instantly appear on your graph. The resultant [Lorenz curve](#) now consists of two distinct lines: the actual distribution and the ideal benchmark.

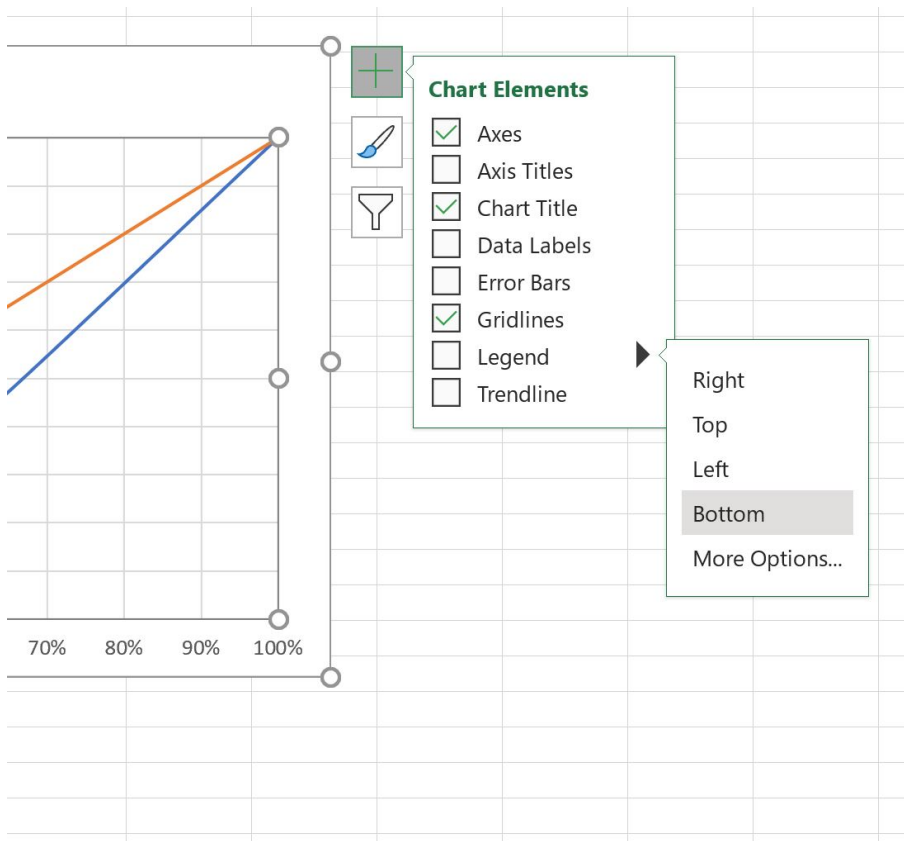


The visual separation between these two lines is the most effective way to communicate the degree of economic inequality to any audience, providing a powerful snapshot of the distribution dynamics.

Step 4: Enhancing Clarity and Professionalism

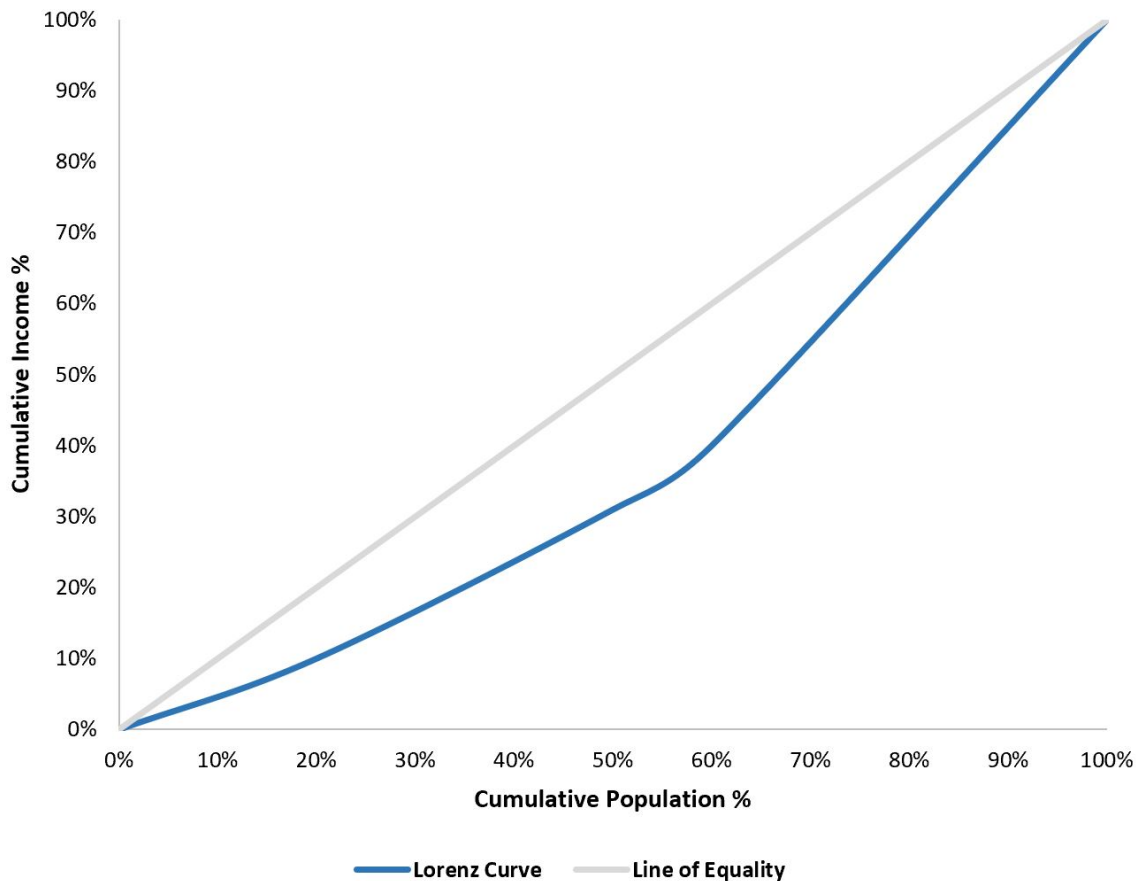
While the core visualization is complete, the final step involves refining the chart's aesthetics and adding essential labels to maximize its clarity and professional appeal. Thoughtful customization ensures that your audience can easily grasp the data presented without ambiguity.

A crucial enhancement is the addition of a **Legend** to differentiate between the two series. Click the green plus (+) icon--known as "Chart Elements"--located near the top-right corner of the chart area. Check the box labeled **Legend**, and strategically place it, such as at the **Bottom**, to clearly label the actual Lorenz curve and the line of equality. This simple step eliminates potential confusion regarding which line represents reality versus the ideal.



Furthermore, attention must be paid to visual noise. Elements like **Gridlines**, while default in many chart types, often clutter the clean presentation required for a Lorenz curve; they should be selected and deleted. You should also customize the visual attributes of the lines themselves: modifying the color, thickness, or dash style of both the distribution curve and the line of equality can significantly improve the overall impact and adherence to presentation guidelines.

Finally, descriptive **Axis Titles** are non-negotiable for statistical integrity. Ensure you label the X-axis as "Cumulative Percentage of Population" and the Y-axis as "Cumulative Percentage of Income." These titles anchor the viewer's understanding of the variables being plotted, thereby providing full context to the complex [data visualization](#) you have created. After these refinements, your enhanced [chart](#) is ready for formal presentation.



Conclusion: Leveraging Data Visualization for Economic Insight

The process of generating a [Lorenz curve](#) in Excel is an exceptionally efficient and clear methodology for visually representing [income distribution](#) and assessing inequality. By diligently following the steps detailed in this guide--from careful cumulative data preparation to sophisticated chart construction and final customization--analysts can produce highly impactful representations of economic disparities.

The immediate visual contrast between the actual distribution curve and the [line of equality](#) provides insights far more rapidly than raw statistical tables. This powerful graphical tool makes it instantly clear how evenly, or conversely how unequally, resources are distributed across a given [population](#) segment.

The [Lorenz curve](#) is therefore indispensable not only for economists and policymakers tracking macro trends but also for researchers and advocates focused on economic justice. We strongly recommend practicing this technique using various real-world datasets to fully solidify your technical proficiency and explore the complete range of analytical interpretations available through effective [data visualization](#).