

Title : The Analysis of Poverty Rates Across Midwestern States
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The **midwest** dataset, available in R, offers comprehensive demographic and socio-economic information about counties in the Midwestern United States. With 437 observations, this analysis examines the percentage of people living below the poverty line (perbelowpoverty) across five states—Illinois(IL), Indiana(IN), Michigan(MI), Ohio(OH), and Wisconsin(WI). Through this analysis, the study aims to highlight variations in poverty rates across these states and identify areas facing significant socio-economic challenges.

The summary statistics[Table 1.1] for the percentage of people living below the poverty line reveal a median of 11.82%, indicating that half of the states in the dataset have poverty rates below this threshold. This suggests that poverty levels are relatively moderate in a majority of states. However, the mean poverty rate of 12.51%, slightly higher than the median, indicates a right-skewed distribution. This skewness, driven by a few states with significantly higher poverty rates that elevate the average, highlights the more severe socio-economic challenges faced by certain regions.

As seen in[Fig. 1.1], Illinois and Indiana have a sharp concentration of poverty rates between 10%–15%, indicating that most counties in these states fall within this range. This aligns with their relatively narrow interquartile ranges(IL: IQR = 5.65, IN: IQR = 4.52) and standard deviations(IL: 5.28, IN: 3.32) as reported in[Table 1.2] and illustrated in[Fig. 1.2], suggesting a more consistent distribution of poverty rates. In comparison, Michigan and Ohio exhibit broader distributions, with portions extending above 15% [Fig. 1.1], indicating higher variability in poverty percentage. Wisconsin, like Illinois, exhibits outlier with a poverty rate significantly higher than the rest of the data, with a long tail extending beyond 30% and approaching 50%, indicating an area of extreme poverty—an observation also evident in the boxplot[Fig 1.2]. However, both states feature a central peak in their distributions, indicating a blend of moderate and extreme poverty levels.

In summary, the overlapping density curves indicate that most states have poverty distributions concentrated around 10%–15%. However, the extended tails of higher poverty rates in Illinois and Wisconsin reveal significant disparities, underscoring the urgent need for targeted interventions and policies to tackle the specific challenges faced by these states.

Minimum	1st Qu.	Median	Mean	3rd Qu.	Maximum
2.18	9.19	11.82	12.51	15.133	48.691

Table 1.1 Summary Statistics of Percentage of People Below Poverty Rate

State	Minimum	1st Qu.	Median	Mean	3rd Qu.	Maximum	IQR	SD
Illinois (IL)	2.71	9.89	12.33	13.07	15.55	32.24	5.65	5.28
Indiana (IN)	3.59	7.85	9.96	10.31	12.38	19.43	4.52	3.32
Michigan (MI)	4.13	11.20	14.29	14.22	17.09	26.41	5.89	4.62
Ohio (OH)	4.89	8.81	11.70	13.03	16.14	28.67	7.32	5.70
Wisconsin (WI)	2.18	9.07	11.42	11.89	13.94	48.69	4.87	5.78

Table 1.2 Summary Statistics of Percentage of People Below Poverty Rate By States

Density Distribution of Poverty Percentage by States

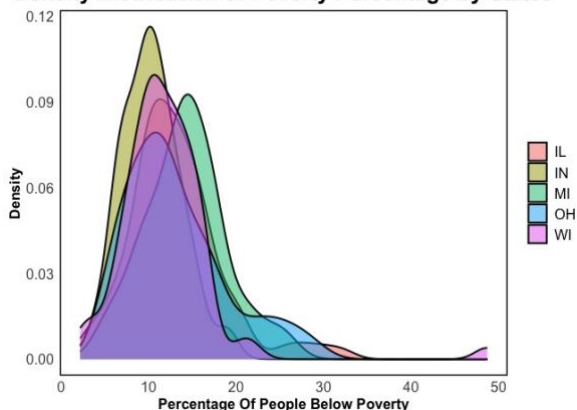


Fig 1.1 Density Distribution of Poverty Percent by States

Poverty Percentage by States

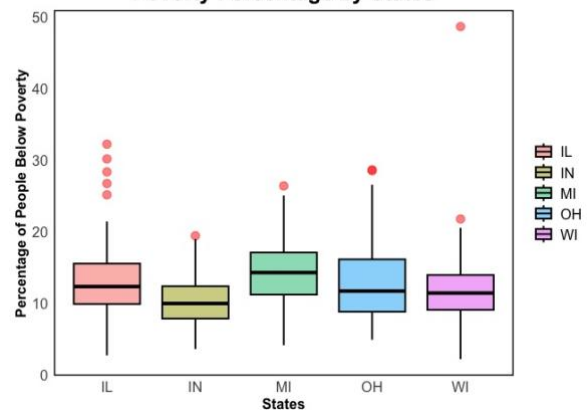


Fig 1.2 Boxplot Distribution of Poverty Rates Across States