

TREDIS® 6 Technical Documentation:
Equity Module

Updated November 2023

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1 Motivation for Equity Reports

This technical document describes the calculations behind the Equity Module of TREDIS.

The Equity Context report is designed to aid users in defining or identifying less advantaged or vulnerable populations. It does this by presenting demographics statistics on the defined project regions and comparing them to the same statistics for the state and national geographies for reference.

The Benefit/Impact Distribution reports are designed to assist users in determining how the benefits and impacts (as estimated by the Benefit-Cost Analysis and Economic Impact Analysis modules) are distributed to regions in the analysis, in the context of a sub-set of the statistics presented in the Equity Context report.

2 Equity Context

For the Equity Context Report, measures are reported for Region, State, and the US. These figures are generally taken from the American Community Survey figures for counties and county-equivalents in the US (excluding of Puerto Rico).

These data are associated with a data year, since they change each year. For example, a project that uses fixed factors that are in 2021 dollars will be associated with 2021 demographic data.

While the ACS is not the only collector of demographic data, some of the definitions used by the ACS define the meaning of the measure as presented, and so are discussed below under individual notes.

Population, Households. These are simply levels meant to give context on population size and can be taken directly from the ACS.

Weighted Median HH Income. TREDIS reports the median household income for regions, rather than the mean value, since mean incomes are highly skewed by a long tail of high earners and are less representative of the "average" experience. For regions that are a single county, this is simply the median household income. For multi-county regions, this is calculated as the average of the medians of each county, weighted by the households in each county. For this measure, the median household income of each is taken in each county in the region, and averaged (via a weighted mean) across the multi-county area.

Poverty Rate. The poverty threshold is per the ACS, and all percentages are of the population for which ACS could determine poverty status.

Unemployment Rate. The definition of "unemployment" is per the Local Area Unemployment Statistics program at the Bureau of Labor Statistics. (This data is formatted and presented for all US counties by the Economic Research Service of the USDA.)

Carless Households. This is per the definition of the ACS as households with "no cars available" to them, as a percentage of all households.

Percent With a Disability. This is the percentage of people with a disability out of the entire Civilian Noninstitutionalized Population (as defined by the ACS).

Household Income. This is the income at the household level (not wealth or earnings).

Percent Not a US Citizen. This is the percentage of people in the entire population that are not a US citizen.

Race & Ethnicity. These are percentages of the entire population identifying as given. Anyone identifying as "Hispanic or Latino" is classified under that rubric; other categories are subsets of the remaining population.

Educational Attainment. These percentages are out of the population 18 and older.

Age. These percentages are out of the entire population.

3 Benefit/Impact Distribution

The Transportation Benefits and Economic Impacts subreports have a similar function – to show the shares of benefits or impacts along with select statistics from the Equity Context report (under the Baseline heading) for the current Data Year. The purpose of each subreport is to show how the share of a regions' benefits or impacts relate to its standing among all the regions in terms of these select equity measures.

In each of these reports, the Share of Cost (Cumulative) column is the sum of the differences in project cost (that is, project alternative cost minus base alternative cost in each region), without any discounting applied.

Transportation Benefits. The share of benefits in each region are shown with statistics from the reference year (as shown in the Equity Context report). You can select which year of benefits you wish to review, but the Equity Context variables are always for an observed year as forecasts of these detailed demographic characteristics are likely highly unreliable (and could be inconsistent with the transportation modeling that produces benefits).

Share of Forecast Population is the percentage of the entire population, as forecast by TREDIS in the Base alternative.

Share of Passenger Savings and Share of Freight Savings are calculated as the share of the total savings, where travel happening within the region is associated with the region, and half of all incoming and outgoing trips' benefit are associated with that region. Through trips or portions of trips going into, within, or out of an "External" region are not counted.

The report can be used to determine if benefits accrue disproportionately between regions and if projects primarily benefit residents of less-advantaged regions.

Economic Impacts. The share of economic impacts in each region are shown with statistics from the reference year (as shown in the Equity Context report). Year selection and reporting options are the same as for Transportation Benefits.

Share of Job Impacts and Share of Income Impact are calculated as the share of the total jobs or labor income impacts (i.e., the job and labor income difference between the Base and Project alternatives) for the given region. (As everywhere in the results from the Economic Impact Analysis, "jobs" are headcount employment, not FTE, and "labor income" is all wages and benefits, including, for example, employer-paid health insurance.)

Share of Forecast Jobs is the percentage of all jobs in the modeled regions, as forecast by TREDIS in the Base alternative.

Share of Forecast Income is the percentage of all income in the modeled regions, as forecast by TREDIS in the Base alternative.

The report can be used to determine if benefits accrue disproportionately between regions and if projects primarily benefit residents of less-advantaged regions.

Reference Levels. Relative distribution for each of the equity variables of interest among the geographic units are shown.

The measures shown for the Modeled Regions take each Region defined in the model as an observation. The State and National geographies take each county in the state or the US as the unit of observation.

For each equity measure, three measures are shown:

- Top 20th is the cutoff point above which 20% of regions (or counties for the US or state geographies) have higher levels of the observed statistic.
- Median is the median observation for the statistic among the observations.
- Bottom 20th is the cutoff point below which 20% of regions (or counties for the US or state geographies) have lower levels of the observed statistic.