

Pay-As-You-Go Equity Analysis

This analysis uses ZIP code data to examine the association between PAYG utilization and equity-focus communities in Los Angeles County.

Data:

The data sources used are:

1. Metro Equity Focus Communities (EFCs) shapefile data.
2. ExpressLanes PAYG trip counts by ZIP code, between September 1, 2021 and August 31, 2022.
3. ExpressLanes total trip counts by ZIP code, between September 1, 2021 and August 31, 2022.

Note that the total trip counts used here is the sum of all PAYG trips and all trips made by Metro ExpressLanes account holders.

Calculation of Pay-As-You-Go Utilization

Only Non-FasTrak trips that were paid at the \$4 notice escalation level were considered to be utilizing the new PAYG policy. Non-FasTrak trips that were paid at later escalation levels were not considered to be taking advantage of the new PAYG policy, since the fees at those stages are equivalent to the escalation levels already in place before the PAYG policy was implemented.

To account for the fact that ZIP codes closer to the corridors are expected to produce more ExpressLanes trips in general, the number of trips utilizing the new PAYG policy in any given ZIP code was normalized by the total number of ExpressLanes trips made by that ZIP code. The resultant percentage is referred to as the "PAYG Utilization Rate" for that ZIP code.

Assigning EFC Values by ZIP Code

Because trip data are available only at the ZIP code spatial aggregation level, whereas EFC data are available on a finer spatial resolution, the overall analysis is done at the ZIP code level. To accommodate this, the EFC tract data had to be translated into ZIP code areas. The process used to perform this conversion was as follows:

1. Assign a numeric EFC value between 0 and 1 for each EFC tract:
 - a. "Very Low Need" areas = 0.00
 - b. "Low Need" areas = 0.25
 - c. "Moderate Need" areas = 0.50
 - d. "High Need" areas = 0.75
 - e. "Very High Need" areas = 1.00
2. Calculate the area of each EFC tract (by area) that falls within a given ZIP code, and multiply that area by the EFC's numeric value from (1) above. This constitutes that tract's proportional EFC contribution to the ZIP code.
3. Sum the contributions from (2) for all of the tracts within a given ZIP code to obtain a composite EFC value, which we will refer to as the "EFC Concentration" for the ZIP code.

As illustrative conceptual examples of the above procedure:

- a ZIP code composed entirely of "very high" EFC tracts would receive an overall EFC concentration value of 1.00 or 100%.
- a ZIP code composed of an even split of "high" and "low" EFC tracts by area would receive an overall EFC concentration value of 0.50 or 50%.

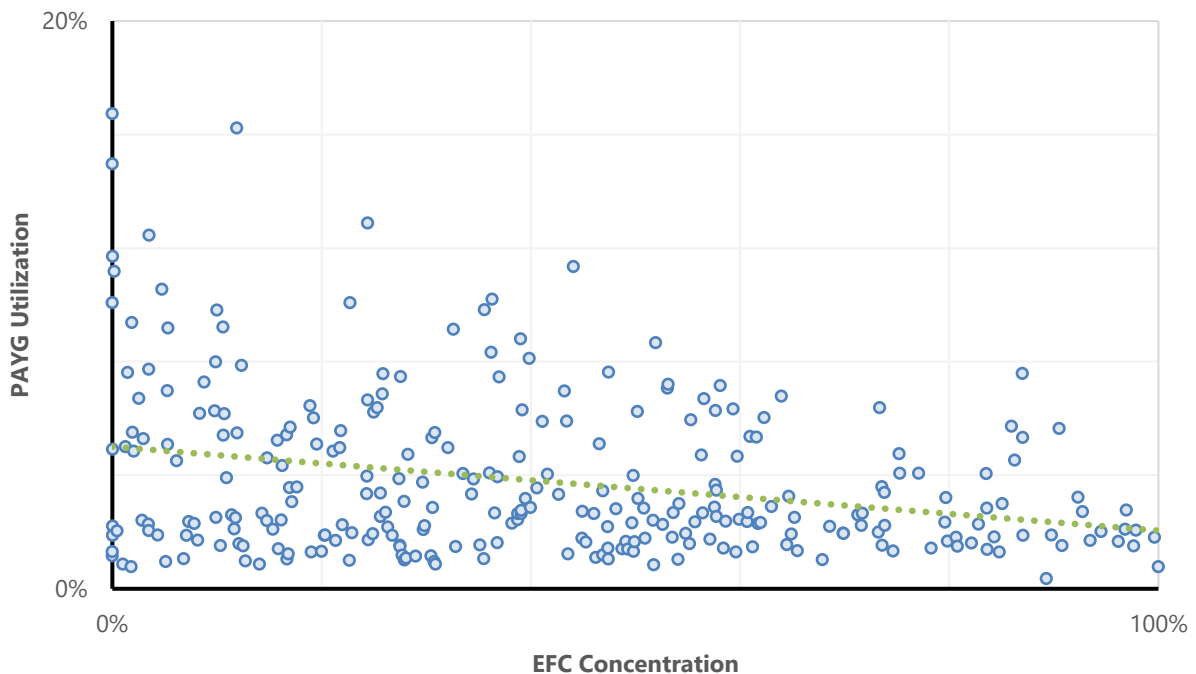
- a ZIP code comprised of entirely “very low” EFC tracts would receive an overall EFC concentration value of 0.00 or 0%.

Because EFCs are only defined for Los Angeles County, any portions of ZIP codes that extended beyond the LA County border were truncated at the county line. Trip counts for those ZIP codes were reduced according to the proportion of the total ZIP code’s area that was within LA County.

Findings

Once each ZIP code was assigned an “EFC Concentration” value, it was possible to explore the quantitative correlation between that value and PAYG trip utilization on a ZIP-code basis. A chart showing the relationship between these two variables is shown below. ZIP codes with less than 1,000 trips were excluded from the analysis due to low sample sizes. Out of 321 ZIP codes, only 44 had to be excluded as a result of this filtering criterion.

Figure 1: PAYG Utilization and EFC Status by ZIP code



A linear regression revealed a slightly negative correlation between the two variables:

$$y = -0.0396x + 0.0501$$

where:

- x = the ZIP code’s EFC concentration value
- y = the ZIP code’s PAYG utilization rate

The correlation was very weak, however, with an R² value of 0.080. These results also assume that all the prerequisite conditions for linear regression are satisfied by the underlying data.

The table below provides PAYG Utilization averages by ZIP code, according to the ZIP code’s EFC Concentration value.

EFC Concentration Range for ZIP Code	EFC Equivalent Label	Total ZIP Codes*	Average PAYG Utilization Rate (averaged across all ZIP codes)
0-20%	Very Low Need	77	4.87%
20-40%	Low Need	72	3.94%
40-60%	Moderate Need	62	3.45%
60-80%	High Need	36	2.91%
80-100%	Very High Need	30	2.62%

**After filtering out ZIP codes with fewer than 1,000 trips, as explained earlier.*