SNAP Application Processing Timeliness (2012–2023): EDA, Maps, and a Simple Difference-in-Differences

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1 Overview

This short report analyzes state-level SNAP (Supplemental Nutrition Assistance Program) *application processing timeliness*—the percent of applications processed on time. We use wide-format data for 50 states plus DC covering FY2012–FY2019 and FY2022–FY2023 (FY2020–FY2021 are missing due to COVID-related disruptions in national reporting). We provide:

1. Exploratory data analysis (EDA) across years and states,
2. GIS-style choropleth maps for levels and changes,
3. A simple Difference-in-Differences (DiD) comparing states with large post-2019 declines to others.

2 Data

The working dataset (`snap_timeliness_wide.csv`) contains one row per state and one column per fiscal year (2012, 2013, . . . , 2019, 2022, 2023). Rates are percentages (0–100).

3 Exploratory Data Analysis

Figure 1 shows a simple time-series view for four large states. Broadly, rates were high and stable pre-2020, then declined in 2022–2023 for many states.

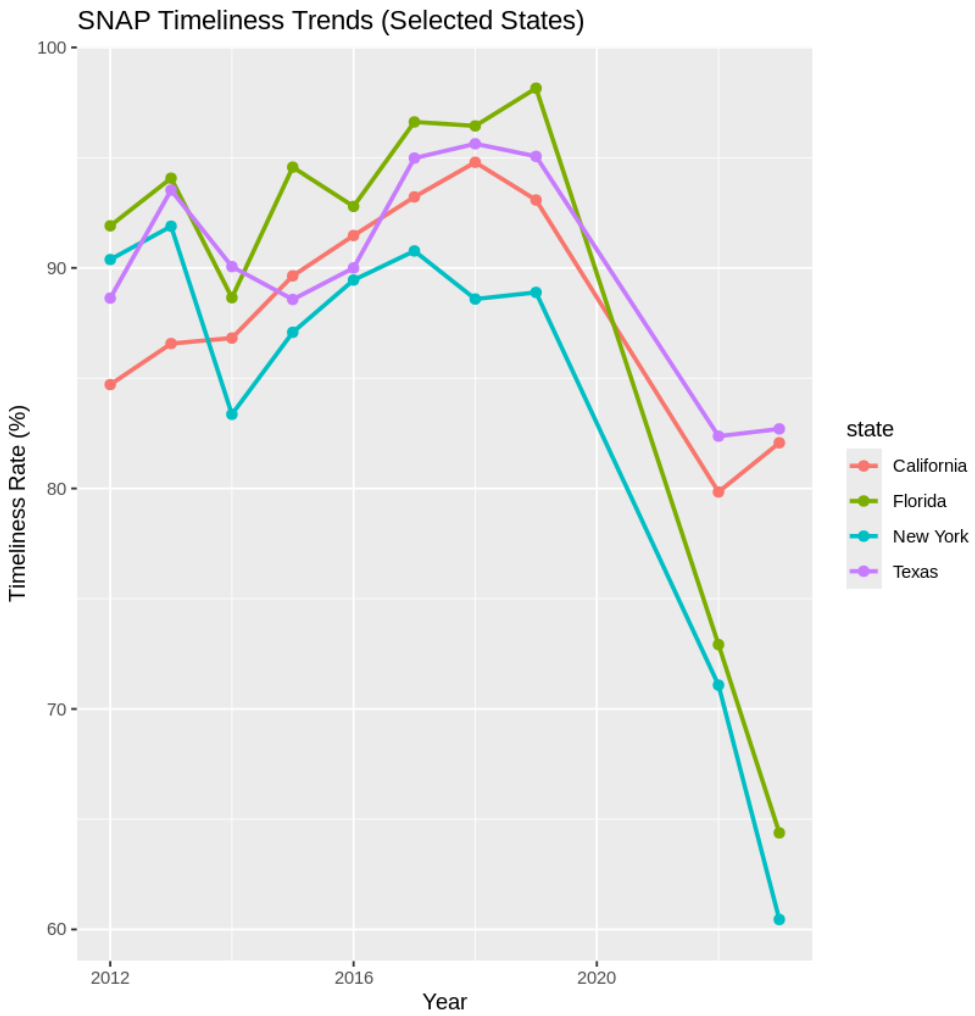

Figure 1: SNAP timeliness trends for selected states (illustrative).

We also examine the cross-state distribution each year (Figure 2). The center of the distribution improved during 2015–2019, then shifted downward and widened in 2022–2023.

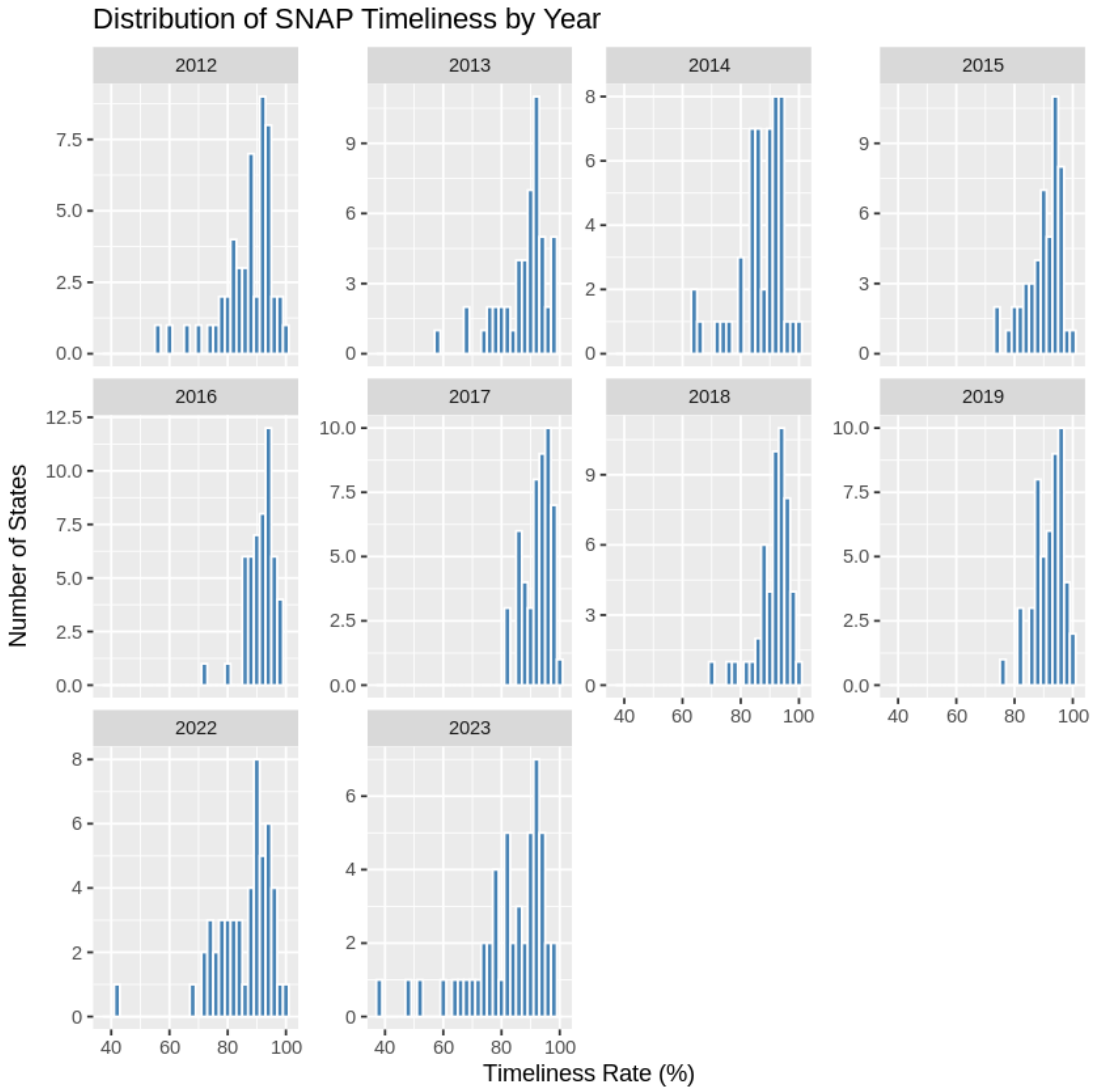

Figure 2: Distribution of state timeliness rates by year.

4 GIS Maps

We produce two choropleths: levels in 2019 (pre-COVID) and the change from 2019 to 2023.

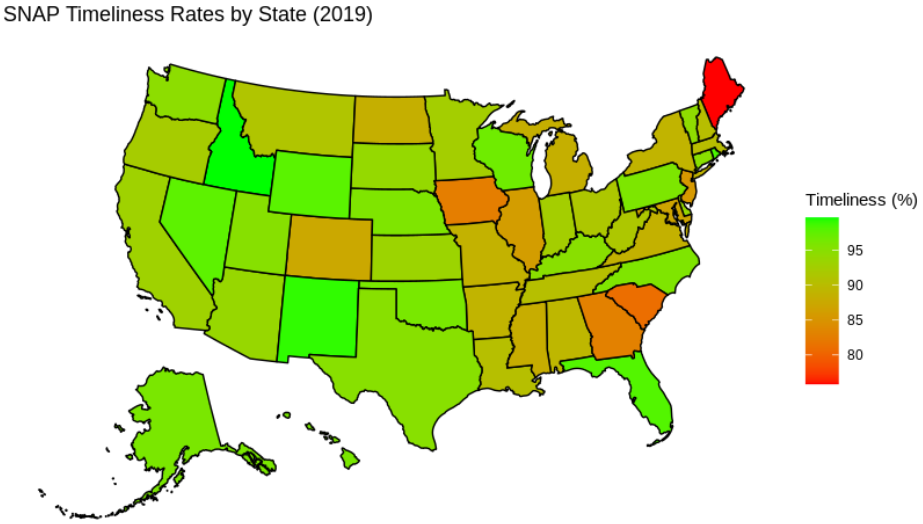

Figure 3: SNAP timeliness by state in 2019 (higher is greener).

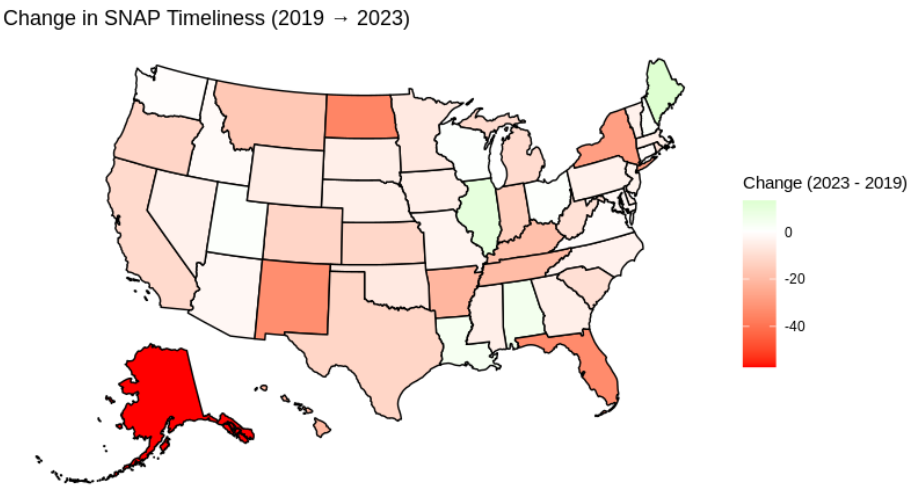

Figure 4: Change in timeliness, 2019 → 2023 (red = decline, green = improvement).

5 Difference-in-Differences (DiD)

Design (in plain language)

We split states into two groups:

- **Treatment:** states with large declines between 2019 and 2023 (e.g., bottom quartile of the 2019→2023 change).
- **Control:** the remaining states.

The **pre** period is 2012–2019; the **post** period is 2022–2023. We estimate:

$$Y_{it} = \alpha + \beta\,\text{Treat}_i + \gamma\,\text{Post}_t + \delta\,(\text{Treat}_i \times \text{Post}_t) + \mu_i + \lambda_t + \varepsilon_{it},$$

where Y_{it} is the timeliness rate for state i in year t, μ_i are state fixed effects (time-invariant differences), and λ_t are year fixed effects (national shocks). The DiD coefficient δ is the extra

post-2019 change for treated states relative to controls.

Event pattern (means by group)

Figure 5 plots yearly averages for treated vs. control states. Treated states track controls before 2020 but fall much more afterward.

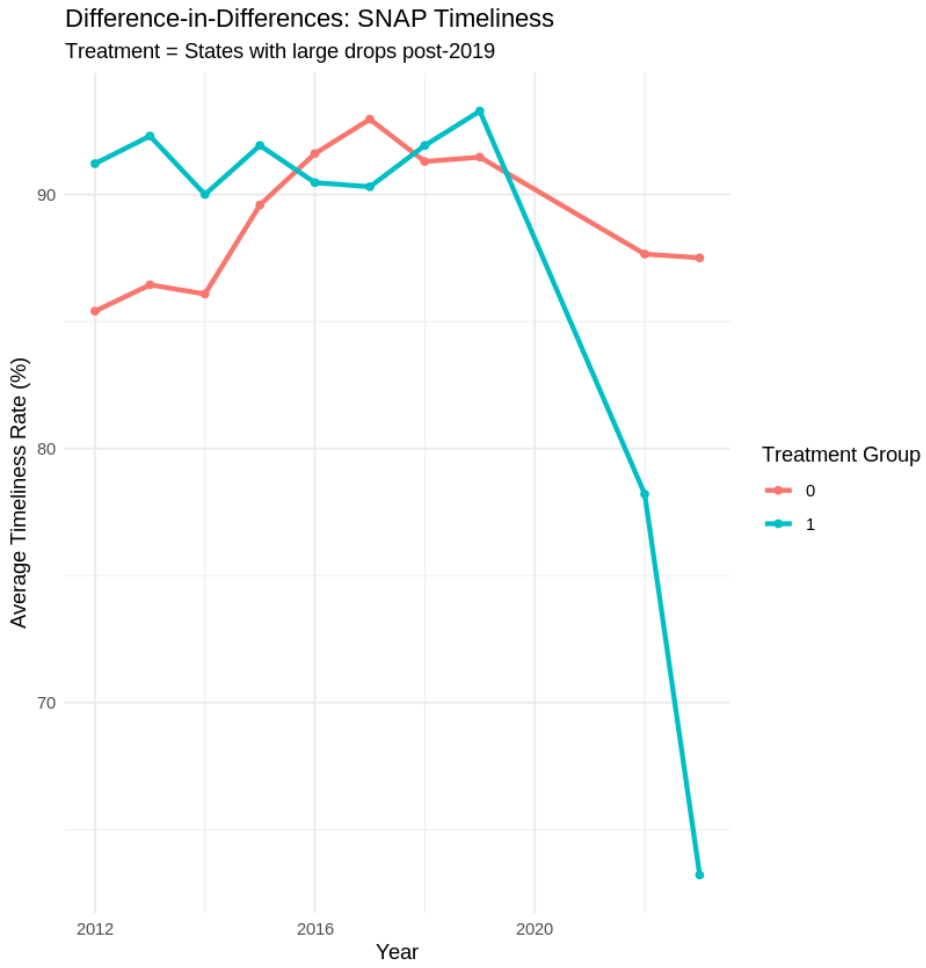

Figure 5: Average timeliness by year for treatment vs. control states (construction based on large post-2019 drops).

Result (illustrative)

A two-way fixed-effects regression (state and year FE) gives an estimated DiD effect of about -19 **percentage points** for treated states post-2019 (statistically significant). Interpretation: relative to control states, the treatment group's timeliness fell an additional $\sim$19 points in the post period.

Assumptions & limitations

- **Parallel trends:** pre-2020 trends should be similar across groups in the absence of the shock. Visual checks support approximate parallelism but cannot prove it.
- **Group definition:** the treatment group is defined *using the outcome* (largest declines), so this is best viewed as *descriptive DiD*: it quantifies how much worse the bottom performers did relative to others, not a causal effect of a specific policy.
- **Missing years:** FY2020–FY2021 are unavailable; we use 2022–2023 as the post window, which may include lingering pandemic-era operational constraints.
- **Unobserved shocks:** unmeasured state-specific changes after 2019 (e.g., staffing, IT systems, policy waivers) could drive differences.

6 Takeaways

- Pre-2020, timeliness was high and fairly tight across states; 2022–2023 show broad declines and more dispersion.
- Several states experienced very large drops between 2019 and 2023; the change map highlights where declines were steepest.
- The simple DiD contrasts bottom-quartile decliners with the rest and finds an additional post-2019 drop of roughly 19 points for the treated group.
- For policy work, next steps could link operational features (online applications, call centers, chatbots, waivers) to timeliness, and test targeted reforms.