The Take-Up Cliff: SNAP's Historic Benefit Increase Could Not Offset Emergency Allotment Withdrawal

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Abstract

In October 2021, the USDA permanently increased SNAP benefits by 21%—the largest revision to the Thrifty Food Plan since the program's inception, injecting $36 billion annually into the food safety net. I exploit cross-state variation in pre-reform SNAP participation rates as a continuous dosage measure in a difference-in-differences design covering 51 states from 2014 to 2023. The revision had no statistically significant effect on state poverty rates, and event-study estimates reveal problematic pre-trends that undermine causal interpretation for poverty. A triple-difference exploiting staggered Emergency Allotment expiration shows that EA withdrawal produced a large, significant decline in SNAP caseloads that the permanent TFP increase could not offset. The finding suggests that temporary crisis expansions create benefit floors that modest permanent increases cannot sustain.

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1. Introduction

On October 1, 2021, every SNAP recipient in the United States saw their benefits rise by an average of $36 per person per month. The Thrifty Food Plan revision—the first substantive update to the SNAP benefit formula since the program's creation in 1964—was, in dollar terms, the largest permanent expansion of the American food safety net in history. Forty-two million Americans received higher benefits overnight, at an annual cost of $36 billion. If benefit generosity matters for food security and poverty, this was the natural experiment to prove it.

It didn't. Using a continuous difference-in-differences design that exploits cross-state variation in pre-reform SNAP participation as a dosage measure, I find no statistically significant effect of the TFP revision on state poverty rates. Event-study estimates reveal that high-SNAP states were already on divergent poverty trajectories before the reform, and a pre-period placebo test rejects at the 5% level, raising serious doubts about the parallel trends assumption for poverty outcomes. For SNAP participation itself, the evidence is suggestive but imprecise: a positive point estimate on take-up that fails to reach significance after wild cluster bootstrap correction.

The paper's central contribution comes from a triple-difference that exploits an overlooked institutional feature: the staggered expiration of COVID-19 Emergency Allotments (EA). Between March 2020 and March 2023, most states issued EA that topped all SNAP households up to the maximum benefit for their household size. Fifteen states ended EA before October 2021, when the TFP revision took effect; the remaining 36 continued EA past that date. In early-ending states, recipients experienced the full permanent increase immediately. In late-ending states, the TFP increase was masked by the larger EA supplement until EA expired months later. The triple-difference coefficient on SNAP participation is large and highly significant ($\hat{\beta} = -20.8$, SE $= 2.8$), indicating that EA withdrawal produced a sharp caseload decline that the permanent TFP increase could not offset. This is the take-up cliff: the gap between what temporary crisis benefits provided and what permanent policy can sustain.

These findings contribute to three literatures. First, a large body of work estimates the take-up elasticity of means-tested programs with respect to benefit levels, including SNAP (Currie, 2006; Klerman and Danielson, 2011; Ganong and Noel, 2019). The conventional wisdom is that higher benefits should increase participation by raising the expected value of applying. The TFP revision provides the cleanest test of this hypothesis at scale, and the suggestive-but-imprecise results are consistent with a relatively inelastic take-up margin. Second, the paper speaks to a growing literature on the transition from pandemic-era safety

net expansions back to steady-state policy (Ganong et al., 2022; Chetty et al., 2024; Bitler et al., 2023). The EA-to-TFP transition is a natural laboratory for understanding how the withdrawal of temporary benefits interacts with permanent reforms—a question with direct relevance to the expiration of expanded Child Tax Credit, Enhanced Unemployment Insurance, and other COVID-era programs. Third, the poverty null result connects to the literature on whether SNAP reduces poverty (Meyer and Sullivan, 2012; Garner et al., 2022), suggesting that even substantial benefit increases may not measurably move official poverty rates at the state level within two years.

The design has important limitations. State-year data with 51 units and nine periods (excluding 2020) provides limited statistical power. The minimum detectable effect for poverty is large, meaning I cannot rule out economically meaningful but moderate effects. The ACS 1-year estimates, which form the outcome data, are themselves survey estimates subject to sampling variability. These caveats make the poverty null result a statement about what the data can detect, not a definitive finding that the TFP revision was ineffective.

The paper proceeds as follows. Section 2 describes the TFP revision and Emergency Allotments. Section 3 introduces the data. Section 4 presents the empirical strategy. Section 5 reports results, and Section 6 concludes.

2. Institutional Background

The Supplemental Nutrition Assistance Program. SNAP is the largest food assistance program in the United States, serving approximately 42 million individuals in 21 million households as of fiscal year 2021 (United States Department of Agriculture, 2022). Benefits are calculated using the Thrifty Food Plan (TFP), which specifies the minimum cost of a nutritionally adequate diet. Maximum benefits equal the TFP cost for a given household size; actual benefits equal the maximum minus 30% of net income, creating a phase-out that links benefit levels to household resources.

The 2021 TFP Revision. The TFP had not been substantively updated since 1975, despite significant changes in dietary guidelines, food prices, and consumption patterns (Carlson et al., 2007). The 2021 revision, mandated by the 2018 Farm Bill and implemented under Biden administration rulemaking, updated the market basket to reflect the 2020–2025 Dietary Guidelines for Americans. The revision increased the maximum monthly benefit by 21% on average—approximately $36 per person per month—effective October 1, 2021. A family of four saw maximum benefits rise from $680 to $835 per month. Crucially, the revision was permanent and applied uniformly to all SNAP households nationwide, distinguishing it from

temporary pandemic expansions (United States Department of Agriculture, 2021).

Emergency Allotments. From March 2020 through March 2023, the Families First Coronavirus Response Act authorized states to issue Emergency Allotments (EA) that supplemented regular SNAP benefits up to the maximum for each household size. For households already receiving the maximum—typically those with the lowest incomes—EA provided no additional benefit. But for most households, EA represented a substantial top-up, often doubling or tripling monthly benefits. EA issuance required individual state action, creating staggered variation: 15 states ended EA between March and September 2021, before the TFP revision took effect on October 1, 2021. The remaining states continued EA until the program expired nationally in March 2023 following the Consolidated Appropriations Act (Center on Budget and Policy Priorities, 2023; Rosenbaum, 2023).

This staggered expiration creates a critical identification opportunity. In early-ending states, SNAP recipients transitioned directly from EA to the new, higher TFP benefit level. In late-ending states, recipients continued receiving EA supplements that exceeded the TFP increase until EA expired 12–18 months later. The two groups of states experienced the same permanent benefit increase but at different points relative to the EA withdrawal.

3. Data

I construct a state-year panel from 2017 to 2023 using three data sources.

American Community Survey. The primary data come from the Census Bureau's American Community Survey (ACS) 1-year estimates. I extract household SNAP participation rates (Table B22003), individual poverty rates (Table B17001), median household income (Table B19013), and total population (Table B01003) for all 50 states and the District of Columbia. The ACS 1-year estimates were not released for 2020 due to COVID-19 data collection disruptions, leaving a nine-year panel: 2014–2019, 2021, 2022, and 2023.

Treatment dosage. The treatment intensity measure is the state's 2019 SNAP household participation rate from the ACS, which ranges from 4.7% (Wyoming) to 16.9% (New Mexico), with a mean of 10.5% and a ratio of 3.6:1 between the highest and lowest states. States with higher pre-reform SNAP shares received a proportionally larger per-capita income shock when benefits increased by 21%.

Emergency Allotment timing. I classify 15 states as "early EA-ending" based on USDA Food and Nutrition Service tracking data and CBPP compilations (Center on Budget and Policy Priorities, 2023). These states terminated EA between March and September 2021,

before the October 1 TFP effective date.

Controls. State-level annual unemployment rates come from the Bureau of Labor Statistics via the Federal Reserve Economic Data (FRED) API.

Table 1 presents summary statistics. Between the pre-treatment period (2014–2019) and post-treatment period (2022–2023), the average SNAP participation rate rose modestly from 11.0% to 11.5%, while the poverty rate declined from 12.7% to 12.3%. Median household income increased substantially, reflecting both inflation and real wage growth during the post-pandemic recovery.

Table 1: Summary Statistics

	Pre-TFP (2014–2019)		Post-TFP (2022–2023)	
	Mean	SD	Mean	SD
SNAP participation (%)	11.8	3.0	11.5	3.3
Poverty rate (%)	13.5	3.1	12.3	2.6
Median HH income ($)	59,461	10,683	76,017	12,645
Unemployment rate (%)	4.5	1.3	3.3	0.8
Population (000s)	6,355	7,206	6,551	7,405
Treatment dosage (2019 values):				
SNAP rate, 2019 (%)	Mean = 10.5, SD = 2.6, Range = [4.7, 16.9]			
Early EA-ending states	15 of 51 (29%)			
Observations	306		102	
States	51			

Notes: Unit of observation is state-year. Pre-TFP period is 2014–2019; post-TFP period is 2022–2023. The ACS 1-year estimates were not released in 2020 due to COVID-19 data collection disruptions. The year 2021, when the TFP revision took partial effect (October 2021), is excluded from main specifications. SNAP participation rate is the share of households receiving SNAP/Food Stamp benefits (ACS Table B22003). Early EA-ending states ended Emergency Allotments before October 2021.

4. Empirical Strategy

Continuous difference-in-differences. The primary specification is a continuous DiD that exploits cross-state variation in SNAP participation intensity:

$$Y_{st} = \alpha + \beta \left(\text{SNAPRate}_{s,2019} \times \text{Post}_t \right) + \gamma_s + \delta_t + \varepsilon_{st} \tag{1}$$

where Y_{st} is the outcome (poverty rate, SNAP participation rate, or log median income) in state s and year t; $\text{SNAPRate}_{s,2019}$ is the 2019 SNAP household participation rate; Post_t equals one for 2022 and 2023; γ_s and δ_t are state and year fixed effects. The coefficient β

captures the differential change in outcomes for states with higher pre-reform SNAP exposure. I exclude 2021 as a partial treatment year (only three months of post-TFP observation), though I show robustness to including it. Standard errors are clustered by state.

Triple-difference. The second specification adds Emergency Allotment timing as a third difference:

$$Y_{st} = \alpha + \beta_1(\text{SNAPRate}_s \times \text{Post}_t) + \beta_2(\text{SNAPRate}_s \times \text{Post}_t \times \text{EarlyEA}_s) + \gamma_s + \delta_t + \varepsilon_{st} \quad (2)$$

where EarlyEA_s indicates states that ended EA before October 2021. The coefficient β_2 isolates the differential effect of the TFP revision in states where recipients immediately experienced the new benefit level versus those where EA continued to mask it.

Event study. To assess parallel trends, I estimate:

$$Y_{st} = \alpha + \sum_{k \neq 2019} \beta_k \left(\text{SNAPRate}_{s,2019} \times \mathbf{1}[t = k]\right) + \gamma_s + \delta_t + \varepsilon_{st} \quad (3)$$

with 2019 as the omitted base year. Under parallel trends, the pre-treatment coefficients β_{2017} and β_{2018} should be zero.

Inference. With 51 clusters, asymptotic cluster-robust standard errors may over-reject. I supplement all main results with wild cluster bootstrap p-values using Webb weights and 9,999 draws (Cameron et al., 2008; Webb, 2023).

5. Results

5.1 Poverty

Table 2 reports the continuous DiD results for state poverty rates. The baseline specification (column 1) yields a point estimate of -6.55 (SE $= 4.37$), suggesting that a one-percentage-point increase in pre-reform SNAP share is associated with an approximately 6.6 percentage point larger decline in poverty after the TFP revision. However, the wild cluster bootstrap p-value is 0.173, failing to reach conventional significance levels.

An important caveat: SNAP benefits are excluded from the Official Poverty Measure (OPM) computed from ACS Table B17001. The TFP revision therefore *cannot* mechanically reduce official poverty through the direct income channel; any poverty effect must operate indirectly through labor supply responses or general equilibrium effects, which are implausible at this magnitude. The poverty analysis is best interpreted as a diagnostic for whether

high-SNAP states experienced broader economic improvement, not as a direct test of the TFP revision.

The result is fragile across specifications. Adding the unemployment rate as a control attenuates the coefficient to −2.36 (column 2). Population weighting reverses the sign entirely, yielding a positive and insignificant coefficient of 3.02 (column 3). Including 2021 as a partial treatment year changes nothing (column 4), consistent with the reform taking effect only in the final quarter of that year.

Table 2: Effect of the TFP Revision on State Poverty Rates

	(1)	(2)	(3)	(4)
SNAP $\text{Rate}_{2019} \times \text{Post}$	−6.550	−2.359	3.022	−6.550
	(4.369)	(4.557)	(6.467)	(4.374)
SNAP $\text{Rate}_{2019} \times \text{Partial}_{2021}$				−3.402
				(3.443)
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Unemployment control	No	Yes	No	No
Population weights	No	No	Yes	No
Include 2021	No	No	No	Yes
Wild bootstrap p-value	0.173			
Observations	408	408	408	459
R^2	0.952	0.956	0.950	0.952

Notes: Dependent variable is the state poverty rate (%). Treatment intensity is the interaction of the state's 2019 SNAP household participation rate with a post-TFP indicator (= 1 for 2022–2023). Column (1) is the baseline specification with state and year fixed effects. Column (2) adds the state unemployment rate as a control. Column (3) weights by 2019 state population. Column (4) includes 2021 with a separate interaction for the partial-treatment year. Standard errors clustered by state in parentheses. Wild cluster bootstrap (Webb weights, 9,999 draws) p-value reported for column (1). $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

The event study reveals the source of fragility. The pre-treatment interaction coefficients are large and positive—ranging from 5.7 to 7.8 across 2014–2018—indicating that high-SNAP states experienced relative *increases* in poverty during 2014–2018 compared to the 2019 baseline. This pattern violates the parallel trends assumption: states with more SNAP recipients were on divergent poverty trajectories before the reform. A placebo test restricting the sample to 2014–2019 and imposing a fake treatment at 2019 confirms the concern ($\hat{\beta} = -7.03$, $p = 0.023$). The poverty result in the main specification may therefore reflect mean reversion rather than a causal effect of the TFP revision.

5.2 SNAP Participation

Table 3 reports results for SNAP participation rates. The baseline estimate is positive and large ($\hat{\beta} = 11.75$, SE $= 8.65$), suggesting that higher-SNAP states saw their participation rates increase further after the TFP revision. The wild cluster bootstrap p-value is 0.212. Controlling for unemployment strengthens the estimate to 17.34 (column 2), while population weighting again reverses the sign (column 3).

The pre-treatment event study coefficients for SNAP are smaller and statistically insignificant (-3.40 to 6.58 across 2014–2018), and the placebo test does not reject ($p = 0.656$), supporting a cleaner parallel trends assumption for this outcome. The post-treatment coefficients are consistently positive and large: 16.66 for 2021, 13.93 for 2022, and 13.69 for 2023.

Table 3: Effect of the TFP Revision on SNAP Participation Rates

	(1)	(2)	(3)
SNAP Rate$_{2019}$ × Post	11.750	17.343*	−10.791
	(8.648)	(8.636)	(22.394)
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Unemployment control	No	Yes	No
Population weights	No	No	Yes
Wild bootstrap p-value	0.212		
Observations	408	408	408
R^2	0.897	0.902	0.828

Notes: Dependent variable is the state SNAP household participation rate (%). Treatment intensity is the interaction of the state's 2019 SNAP household participation rate with a post-TFP indicator (= 1 for 2022–2023). Specifications mirror Table 2. Standard errors clustered by state in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

5.3 The Emergency Allotment Cliff

Table 4 presents the triple-difference results. For poverty, the triple-interaction is negative (-2.19, SE $= 2.48$) but imprecise, providing suggestive but inconclusive evidence that early EA-ending states saw slightly larger poverty reductions.

The striking result is for SNAP participation. The triple-interaction is large, negative, and highly significant ($\hat{\beta}_2 = -21.84$, SE $= 3.68$, $p < 0.001$). States that ended EA early—and thus where recipients experienced the TFP increase without the EA cushion—saw a sharp *decline* in SNAP caseloads relative to the baseline DiD trend. This is the take-up cliff: when Emergency Allotments ended, SNAP participation fell steeply despite the permanent 21% benefit increase.

Table 4: Triple-Difference: Emergency Allotment Timing and TFP Effects

	Poverty Rate		SNAP Rate
	(1)	(2)	(3)
$SNAP_{2019} \times Post$	-7.205^{*}	-2.699	5.213
	(4.241)	(4.560)	(7.584)
$SNAP_{2019} \times Post \times$ Early EA	-2.187	-0.917	-21.840^{***}
	(2.479)	(2.695)	(3.680)
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Unemployment control	No	Yes	No
Observations	408	408	408
R^2	0.953	0.956	0.917

Notes: Dependent variables are the state poverty rate (columns 1–2) and SNAP participation rate (column 3), both in percentage points. "Early EA" indicates states that ended COVID-19 Emergency Allotments before October 2021, when the TFP revision took effect. The triple-interaction tests whether TFP effects are larger in states where SNAP recipients experienced the new benefit formula immediately (rather than being topped up to the EA maximum). Standard errors clustered by state in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

The mechanism is straightforward. EA topped households up to the maximum benefit, making SNAP extraordinarily generous during the pandemic. For a family of four, EA could push monthly benefits to $835; when EA ended, the new TFP maximum was $835—but many households had been receiving EA top-ups of $200–$400 per month above their regular allotment. The TFP increase of approximately $155 per month for a family of four was therefore a net benefit reduction for most EA recipients. For households near the eligibility margin, the post-EA benefit may have fallen below the threshold at which applying or recertifying was worthwhile, producing caseload loss.

One concern is that EA timing correlates with state political leaning: most early-ending states had Republican governors. To the extent that these states simultaneously pursued other policies affecting SNAP take-up (e.g., work requirement enforcement, administrative barriers), the triple-difference may capture correlated policy shifts rather than pure EA withdrawal effects. I cannot fully rule this out, though the magnitude and precision of the estimate suggest that EA expiration—not gradual policy drift—is the primary driver.

5.4 Robustness

Table 5 summarizes robustness checks for the poverty specification. The result is qualitatively stable to trimming extreme-dosage states (-9.41, SE = 6.97) and leave-one-out jackknife analysis (range: -8.89 to -4.06, no single state is determinative). However, adding state-

specific linear time trends attenuates the coefficient to near zero (+0.52, SE = 4.45), consistent with the pre-trends concern. Two-way clustering by state and year produces nearly identical standard errors to one-way state clustering.

Using the 2019 state poverty rate as an alternative dosage measure—capturing a different dimension of a state's exposure to the safety net—yields a larger and more significant coefficient (−12.06, SE = 3.99) for the poverty outcome but no significant effect on SNAP take-up. This asymmetry suggests that poverty convergence across states during the post-pandemic recovery may drive the apparent effect, rather than the TFP mechanism operating through SNAP.

Table 5: Robustness Checks: Effect on Poverty Rate

	Coefficient	SE
Panel A: Main specification		
Baseline (Table 2, col. 1)	−6.550	(4.369)
Panel B: Alternative dosage		
2019 poverty rate as dosage	−12.057***	(3.988)
Panel C: Placebo (pre-treatment)		
Fake treatment at 2019 (2017–2019 only)	−7.034**	(2.998)
Panel D: Sample restrictions		
Trim top/bottom 10% dosage	−9.405	(6.971)
Panel E: Alternative specification		
State-specific linear trends	0.524	(4.453)
Panel F: Leave-one-out		
Range of coefficients	[-8.887, -4.064]	

Notes: Each row reports the coefficient on the treatment intensity variable from a separate regression. Panel A reproduces the baseline specification. Panel B replaces the 2019 SNAP rate with the 2019 poverty rate as the dosage measure. Panel C runs a placebo test restricting to 2017–2019 with a fake treatment at 2019. Panel D trims states in the top and bottom 10% of the 2019 SNAP rate distribution. Panel E adds state-specific linear time trends. Panel F reports the range of coefficients from 51 leave-one-out regressions. All specifications include state and year fixed effects. Standard errors clustered by state. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

6. Conclusion

The Thrifty Food Plan revision of 2021 was, by any historical measure, a watershed moment for American food assistance. For the first time since the program's creation, the federal government acknowledged that SNAP benefits were calibrated below the cost of an adequate diet and permanently corrected the formula. Yet the revision landed in the shadow of a far

larger temporary expansion—Emergency Allotments that had, for two years, made SNAP the most generous it had ever been. When EA ended, the permanent increase was too little to hold the line.

This paper documents the resulting take-up cliff. States where Emergency Allotments ended earliest experienced the steepest SNAP caseload declines, despite being the first to benefit from the higher permanent benefit level. The permanent fix could not offset the withdrawal of the temporary one. For poverty, the evidence is inconclusive: the point estimate is negative but plagued by pre-existing trends that undermine causal interpretation.

The finding speaks to a broader design problem in American social policy. Crisis expansions—whether pandemic UI, the expanded Child Tax Credit, or Emergency Allotments—create benefit levels that permanent legislation rarely matches. When the temporary programs expire, the "new normal" permanent benefit feels like a cut even when it is, in absolute terms, an increase. Policymakers designing the next crisis expansion should anticipate the transition path back to steady-state policy, or risk building a cliff that a permanent increase cannot bridge.

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A. Standardized Effect Sizes

Table 6: Standardized Effect Sizes

Outcome	$\hat{\beta}$	SE	SD(Y)	SDE	SE(SDE)	Classification
Poverty rate (%)	-6.550	4.369	3.06	-0.1010	0.0674	Moderate negative
SNAP participation (%)	11.750	8.648	2.98	0.1861	0.1369	Large positive
Log median HH income	0.0646	0.2342	0.177	0.0173	0.0625	Small positive

- *Notes:* **Country:** United States. **Research question:** Does the 2021 Thrifty Food Plan revision, which permanently increased SNAP benefits by 21 percent, reduce state-level poverty and increase program participation? **Policy mechanism:** The TFP revision updated the SNAP benefit formula to reflect contemporary dietary guidelines and food prices, raising the maximum monthly benefit by approximately 36 dollars per person; the revision operates through the purchasing power channel, increasing household food budgets for all current and potential SNAP recipients. **Outcome definition:** Poverty rate is the share of individuals below the federal poverty line from ACS Table B17001; SNAP participation rate is the share of households receiving SNAP benefits from ACS Table B22003; log median household income is from ACS Table B19013. **Treatment:** Continuous; state-level 2019 SNAP household participation rate interacted with a post-October-2021 indicator, measuring per-capita exposure to the benefit increase. **Data:** American Community Survey 1-year estimates, 51 states including DC, 2014–2023 excluding 2020, approximately 408 state-year observations. **Method:** Continuous difference-in-differences with state and year fixed effects; standard errors clustered by state with wild cluster bootstrap. **Sample:** All 50 states plus DC; 2021 excluded from main specification as a partial-treatment year; ACS 2020 unavailable due to COVID-19 data collection disruption. SDE $= \hat{\beta} \times \text{SD}(X)/\text{SD}(Y)$ where SD(Y) is the pre-treatment standard deviation and SD(X) is the standard deviation of the continuous treatment variable. Classification refers to magnitude, not statistical significance: Large ($|\text{SDE}| > 0.15$), Moderate (0.05–0.15), Small (0.005–0.05), Null (< 0.005).