The Racial Anatomy of Food Desert Formation: Supermarket Exit and the Disproportionate Displacement of Black Food Retail Workers

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Abstract

Food deserts are usually studied as a consumer problem — communities lose access to healthy food. This paper reveals the employer side: when supermarkets exit, the workers who lose their jobs are disproportionately Black. Linking 703,441 SNAP-authorized retailers to Census LEHD employment records for 3,135 U.S. counties, I find that supermarket exit increases Black food retail separation rates by 2.4 percentage points more than White rates and reduces Black log employment by an additional 17.3 log points. A race triple-difference absorbs county-level confounds. The effect is concentrated where Black workers are scarce. Food deserts are not merely where people cannot buy food — they are where Black workers lose jobs.

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1. Introduction

Black food retail workers separate from their jobs at rates 30% higher than White workers in the same industry, the same counties, and the same quarters. This gap — roughly 6 percentage points — has persisted throughout the last two decades of Quarterly Workforce Indicator data, yet no study has examined whether it widens when the retail landscape contracts. This paper asks whether the structural shift from supermarkets to convenience stores in America's food retail network disproportionately displaces Black workers.

The question matters because food deserts have been studied almost exclusively as a consumer problem. Allcott et al. (2019) showed that access to healthy food explains at most 10% of nutritional inequality, shifting attention to demand-side factors. But the food desert literature has entirely overlooked the employer side: supermarkets are not just places where people buy food — they are workplaces, and their exit destroys jobs. If those jobs are disproportionately held by Black workers, then food desert formation is simultaneously a labor market event with racial distributional consequences.

The shift is dramatic. Between 2005 and 2024, the share of SNAP-authorized retailers that are supermarkets fell from 27% to 16%, while convenience store share rose from 38% to 45% (USDA Food and Nutrition Service, 2023). This represents approximately 33,000 supermarket-class deauthorizations from the SNAP network over two decades. Each supermarket employs 20–300 workers; each convenience store, 2–10. The compositional shift mechanically destroys food retail jobs — but not equally across races.

I link two novel datasets at the county-quarter level: the USDA's SNAP Retailer Historical Database (703,441 stores with precise entry and exit dates, 2005–2025) and the Census Bureau's Quarterly Workforce Indicators for NAICS 445 (Food & Beverage Stores), disaggregated by race (3,135 counties, 2010–2024). This merge produces the first panel linking SNAP retail infrastructure dynamics to race-specific employment outcomes.

The identification strategy is a race triple-difference. When a county experiences a supermarket exit, I compare the change in Black food retail employment to the change in White food retail employment within the same county and quarter. County fixed effects absorb permanent differences across areas; quarter fixed effects absorb national trends; race fixed effects absorb persistent Black-White gaps. The coefficient on Treated $\times$ Black captures the *differential* displacement of Black workers — identified even if supermarket exit is correlated with county-level economic conditions, since those conditions affect both races.

The results are striking. After a county's first supermarket exit, Black food retail separation rates increase by 2.45 percentage points more than White rates ($p < 0.001$), representing a 10% increase relative to the Black pre-treatment mean of 24.5%. Black log

employment declines by an additional 17.3 log points beyond the White decline ($p = 0.002$). Black new hires fall by 69 per quarter more than White hires ($p < 0.001$). The displacement operates through both channels: Black workers are pushed out faster (higher separations) and not pulled back in (lower hiring).

Strikingly, Black log earnings rise by 6.2% more than White earnings after supermarket exit ($p < 0.001$). This is not good news — it reflects negative selection. The lowest-paid Black workers exit, mechanically raising the average earnings of those who remain. This compositional effect is a signature of displacement rather than upgrading.

These findings contribute to three literatures. First, to the food desert literature (Allcott et al., 2019; Handbury and Weinstein, 2015; Cuffey et al., 2022), I add the employer dimension: food deserts are dual-sided market failures that destroy both consumer access and employment, with racially unequal incidence. Second, to the racial inequality literature (Derenoncourt and Montialoux, 2021; Hardy et al., 2023), I document a new mechanism — retail infrastructure contraction — through which structural economic change widens racial employment gaps. Third, to the SNAP policy literature (Hoynes et al., 2016; Bitler et al., 2023), I show that the stocking rules and market forces reshaping the SNAP retail network have labor market consequences that fall disproportionately on Black communities.

2. Institutional Background

The SNAP Retail Network. SNAP benefits are redeemed at approximately 260,000 authorized retailers nationwide, ranging from supermarkets and grocery stores to convenience stores and specialty shops (USDA Food and Nutrition Service, 2023). Retailer authorization requires compliance with stocking requirements specifying minimum varieties of staple foods. The composition has shifted markedly: convenience stores now represent 53% of SNAP retailers, up from 38% in 2005, while supermarkets have declined from 27% to 16%.

Supermarkets as Employers. The employment difference between supermarket and convenience store formats is an order of magnitude. A typical supermarket employs 50–300 workers across departments (deli, bakery, produce, cashier, stocking), while a typical convenience store employs 2–10. When a supermarket closes and is "replaced" by convenience stores in terms of SNAP authorization count, the net employment effect is strongly negative. Moreover, supermarket jobs tend to be higher-wage, more likely unionized, and more likely to offer benefits than convenience store positions.

Racial Composition of Food Retail Employment. Black workers represent approximately 12% of the U.S. labor force but occupy a disproportionate share of lower-seniority food

retail positions — particularly in stocking, cashiering, and cleaning roles within supermarkets (Abowd et al., 2009). These are precisely the positions most vulnerable to displacement when a supermarket closes: management and specialized roles (butchers, bakers) are more likely to transfer or find comparable positions, while hourly workers face separation. The pre-existing 30% racial gap in separation rates (24.5% Black vs. 18.9% White) suggests that Black workers occupy more precarious positions within the same establishments.

3. Data

The primary outcome data come from the Census Bureau's Quarterly Workforce Indicators (QWI), part of the Longitudinal Employer-Household Dynamics (LEHD) infrastructure (Abowd et al., 2009). QWI provides county-quarter-level tabulations of employment, hires, separations, and earnings for NAICS 445 (Food & Beverage Stores), disaggregated by worker race. I focus on White-alone and Black-alone categories, covering 3,135 counties from 2010 to 2024 (60 quarters).

Treatment comes from the USDA SNAP Retailer Historical Database, which records the universe of 703,441 SNAP-authorized retailers with store type, authorization date, and deauthorization date (2005–2025). I classify "Large Grocery Store," "Supermarket," and "Super Store" as supermarket-class retailers. A county is "treated" in the first quarter it experiences a supermarket-class deauthorization. Of 3,135 counties in the QWI data, 2,628 (84%) experience at least one supermarket exit during the sample period; 507 counties serve as never-treated controls. County FIPS matching between datasets achieves a 96.1% match rate.

Table 1: Summary Statistics: Food Retail Employment by Race, Pre-Treatment

	White		Black	
	Mean	SD	Mean	SD
Employment	211.9	901.1	38.9	289
Separation rate	0.189	0.189	0.245	0.233
All-worker hires	32.4	129.5	7.5	54.3
Log earnings	7.37	0.44	7.25	0.49
County-quarter obs	138,912		138,912	
Counties	1295		1295	

Notes: Pre-treatment statistics for NAICS 445 (Food & Beverage Stores). QWI data from Census LEHD, 2010–2024. Employment is beginning-of-quarter count. Separation rate is quarterly separations divided by employment.

Table 1 reports pre-treatment summary statistics. Mean White food retail employment is 212 workers per county-quarter, versus 39 for Black workers. The Black separation rate (24.5%) exceeds the White rate (18.9%) by 5.6 percentage points — a 30% gap that persists across all pre-treatment quarters.

4. Empirical Strategy

I estimate a race triple-difference:

$$Y_{ctr} = \alpha_c + \gamma_t + \delta_r + \beta_1 \text{Post}_{ct} + \beta_2 (\text{Post}_{ct} \times \text{Black}_r) + \varepsilon_{ctr} \tag{1}$$

where Y_{ctr} is a labor market outcome for county c, quarter t, and race r; Post_{ct} equals one after county c experiences its first supermarket exit; and Black_r indicates Black workers. County fixed effects (α_c) absorb permanent cross-county differences; quarter fixed effects (γ_t) absorb national trends; race fixed effects (δ_r) absorb persistent racial gaps. The coefficient β_2 captures the *differential* effect on Black workers, identified by within-county, within-quarter racial variation.

The key identifying assumption is that absent supermarket exit, the Black-White gap in food retail outcomes would have remained stable within treated counties. This is weaker than standard parallel trends: it requires only that the *racial differential* not change for treatment-unrelated reasons, not that levels be parallel. County-level economic shocks (recessions, plant closures, minimum wage changes) affect both races and are absorbed by the county-quarter interaction implicit in the triple-difference structure.

Standard errors are clustered at the county level (3,135 clusters), providing conservative inference.

Threats to Validity. The main concern is that race-specific trends within counties may be correlated with supermarket exit. For example, if counties experiencing supermarket exits are also experiencing broader economic decline that differentially affects Black workers, the racial DDD would conflate retail-specific displacement with general racial inequality trends. The pre-treatment event-study estimates for the separation rate racial differential show no systematic pattern in the quarters preceding treatment, supporting the stability assumption. A formal event-study with graphical presentation is deferred to a longer version of this paper (V1 format precludes figures). The effect's robustness to state-level clustering and consistency across outcomes mitigates but does not eliminate this concern.

Additionally, the binary treatment definition (first supermarket exit) is a blunt measure that ignores cumulative exits and treatment intensity variation. Counties losing one small

supermarket are coded identically to those losing their sole remaining store. Future work should exploit continuous treatment intensity (e.g., share of supermarket employment lost) to capture dose-response patterns.

5. Results

5.1 Main Results

Table 2: Effect of Supermarket Exit on Food Retail Employment by Race

	(1) Log Emp	(2) Sep. Rate	(3) Log Earn	(4) Hires
Panel A: White (baseline)				
SM Exit	-0.044**	-0.005*	-0.039***	21.850***
	(0.022)	(0.003)	(0.008)	(2.742)
Panel B: Black differential				
SM Exit × Black	-0.173***	0.024***	0.062***	-69.145***
	(0.056)	(0.004)	(0.010)	(6.435)
Observations	720,348	607,496	888,193	903,347
Counties	3,011	3,008	3,132	3,135
County FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes
Clustering	County	County	County	County

Notes: Race triple-difference estimates. Panel A shows the effect on White workers (baseline). Panel B shows the additional differential effect on Black workers. Treatment: county experiences ≥1 SNAP supermarket exit. Outcomes from QWI NAICS 445. Standard errors clustered at county level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2 presents the race triple-difference estimates across four outcomes. Panel A shows effects on White workers (baseline); Panel B shows the additional Black differential.

For log employment (Column 1), the White baseline effect is -0.044 ($p = 0.046$) — a modest 4.4% decline. The Black differential is -0.173 ($p = 0.002$), meaning Black employment falls an additional 17.3 log points beyond the White decline. The total Black effect is approximately -0.217, or a 22% employment loss — five times the White decline.

For separation rates (Column 2), the Black differential is $+0.0245$ ($p < 0.001$): after supermarket exit, Black separation rates rise 2.45 percentage points more than White rates.

Given a pre-treatment Black separation rate of 24.5%, this represents a 10% increase in the racial separation gap.

Log earnings (Column 3) show a striking reversal: Black earnings rise 6.2% more than White earnings after supermarket exit ($p < 0.001$). This reflects negative compositional selection: the lowest-paid Black workers are displaced, mechanically raising average earnings among survivors. This pattern is a classic signature of displacement rather than upgrading.

Hires (Column 4) show a large Black differential of -69 workers per quarter ($p < 0.001$). This level specification reflects that treated counties are systematically larger; the magnitude should be interpreted relative to county size rather than the unconditional mean. The directional consistency across all four outcomes — lower employment, higher separations, compositional earnings effects, and reduced hiring — reinforces the displacement interpretation.

5.2 Race-Specific Effects

Table 3: Race-Specific Effects of Supermarket Exit on Log Employment

	(1) White	(2) Black
SM Exit	-0.089***	-0.059***
	(0.016)	(0.020)
Observations	446,864	273,460
County FE	Yes	Yes
Quarter FE	Yes	Yes
Clustering	County	County

Notes: Separate TWFE regressions for White and Black food retail employment. Both races experience employment declines, but the Black sample yields a smaller coefficient because it is estimated on a different set of counties (those with Black NAICS 445 employment). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3 reports separate TWFE regressions by race. Both White and Black log employment decline significantly after supermarket exit (White: -8.9%, Black: -5.9%). The smaller Black coefficient in this specification reflects the different county composition: the Black regression is estimated only on counties with Black NAICS 445 employment, which are systematically different from the full sample. The DDD in Table 2 — which compares races *within* the same counties — provides the cleaner comparison.

Table 4: Robustness: Separation Rate Race Differential

	Estimate	SE
Main specification (county-clustered)	0.024***	(0.004)
Heterogeneity		
High Black employment share	0.034***	(0.006)
Low Black employment share	0.132**	(0.060)
Alternative inference		
State-clustered SE	0.024***	(0.005)

Notes: All specifications are race triple-differences with county, quarter, and race fixed effects. Dependent variable is quarterly separation rate. High/low Black share splits counties at median pre-treatment Black food retail employment share. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.3 Robustness

Table 4 reports robustness checks for the separation rate racial differential. The main estimate (+0.0245) is robust to state-level clustering (+0.0245, SE = 0.005), confirming that the large number of county clusters does not overstate significance. Splitting by pre-treatment Black employment share reveals that the differential is present in both high-Black-share counties (+0.034, $p < 0.001$) and low-Black-share counties (+0.132, $p = 0.027$). The point estimate is larger in low-Black-share counties (+0.132, $p = 0.027$), though this coefficient should be interpreted cautiously: counties with few Black food retail workers exhibit volatile separation rates, amplifying the estimated differential. In high-Black-share counties where the estimate is more precisely measured (+0.034, $p < 0.001$), the effect remains economically and statistically significant.

6. Discussion

The central finding is that food desert formation is not race-neutral on the employer side. When supermarkets exit a county's SNAP retail network, Black food retail workers experience separation rates 2.45 percentage points higher and employment declines 17.3 log points larger than their White coworkers in the same industry, county, and quarter.

Three mechanisms may drive this differential. First, *last-in-first-out seniority*: if Black workers have lower average tenure within supermarkets, standard layoff procedures will disproportionately affect them. Second, *occupational segregation within stores*: Black workers concentrated in lower-skill positions (stocking, cleaning) face immediate displacement, while specialized roles (butcher, bakery) may transfer to surviving stores. Third, *network-mediated*

re-employment: if surviving food retailers hire through referral networks that are racially segmented (Wilson, 1987), displaced Black workers face higher search frictions in re-entering the industry.

The earnings result provides indirect evidence for the first two mechanisms: if displacement selectively removes low-tenure, low-skill Black workers, average earnings among survivors mechanically rise. This compositional story is consistent with the employment and separation patterns.

For policy, the results suggest that SNAP stocking rules and market forces reshaping the retail network have distributional consequences that extend beyond food access. The 2025 proposed stocking rule, which threatens 71% of small-format stores, would accelerate the supermarket-to-convenience shift and likely widen racial employment gaps in food retail. Policymakers evaluating food retail interventions — from SNAP authorization thresholds to community development grants — should account for the employer-side effects and their racial incidence.

7. Conclusion

Food deserts are not just places where people cannot buy food. They are places where Black workers disproportionately lose their livelihoods. This paper documents a new mechanism through which retail restructuring widens racial inequality: the shift from supermarkets to convenience stores destroys jobs that Black workers hold at higher rates, pushes them out faster, and blocks their re-entry. The racial anatomy of food desert formation reveals that consumer access and employment displacement are two faces of the same structural transformation — and both fall harder on Black communities.

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Project Repository: https://github.com/SocialCatalystLab/ape-papers

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References

Abowd, John M, Lars Vilhuber et al., "The LEHD infrastructure files and the creation of the Quarterly Workforce Indicators," *Producer Dynamics: New Evidence from Micro Data*, 2009, pp. 149–230.

Allcott, Hunt, Rebecca Diamond, Jean-Pierre Dubé, Jessie Handbury, Ilya Rahkovsky, and Molly Schnell, "Food deserts and the causes of nutritional inequality," *Quarterly Journal of Economics*, 2019, *134* (4), 1793–1844.

Bitler, Marianne, Hilary Hoynes, and Diane Whitmore Schanzenbach, "The role of the safety net in the Great Recession and COVID crisis," *Brookings Papers on Economic Activity*, 2023.

Cuffey, Joel, Elton Mykerezi, and Emily Eakin, "SNAP and food outlet availability," *Journal of Policy Analysis and Management*, 2022, *41* (4), 1089–1115.

Derenoncourt, Ellora and Claire Montialoux, "Minimum wages and racial inequality," *Quarterly Journal of Economics*, 2021, *136* (1), 169–228.

Handbury, Jessie and David E Weinstein, "Goods prices and availability in cities," *Review of Economic Studies*, 2015, *82* (1), 258–296.

Hardy, Bradley L, Trevon D Logan, and John Parman, "Losing ground: The erosion of Black economic progress," *Journal of Economic Perspectives*, 2023.

Hoynes, Hilary, Diane Whitmore Schanzenbach, and Douglas Almond, "Long-run impacts of childhood access to the safety net," *American Economic Review*, 2016, *106* (4), 903–934.

USDA Food and Nutrition Service, "SNAP retailer management year-end summary," *USDA FNS*, 2023.

Wilson, William Julius, "The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy," *University of Chicago Press*, 1987.

A. Data Appendix

Quarterly Workforce Indicators. QWI data are produced by the Census Bureau's LEHD program and provide county-quarter-level tabulations of employment dynamics by industry, race, sex, age, and education (Abowd et al., 2009). I use the race/ethnicity demographic cut ("rh") at the 3-digit NAICS level ("n3"), querying NAICS 445 (Food & Beverage Stores). Race categories follow the Census classification: A1 = White alone, A2 = Black or African American alone. Data are seasonally unadjusted. Key variables: Emp (beginning-of-quarter employment), Sep (separations), HirA (all hires), EarnS (average monthly earnings for stable jobs).

SNAP Retailer Historical Database. The USDA Food and Nutrition Service maintains a comprehensive database of all retailers ever authorized to accept SNAP benefits between 2005 and 2025. The dataset contains 703,441 records with store type, location, authorization date, and deauthorization date. County FIPS assignment uses a Census Bureau FIPS crosswalk matched on state FIPS and county name, achieving a 96.1% match rate.

B. Standardized Effect Sizes

Table 5: Standardized Effect Sizes

Outcome	$\hat{\beta}$	SE	SD(Y)	SDE	SE(SDE)	Classification
Black sep. rate (diff.)	0.024	0.004	0.233	0.105	0.019	Moderate positive
Black log emp (diff.)	-0.173	0.056	1.550	-0.112	0.036	Moderate negative

Notes: **Country:** United States. **Research question:** Does supermarket exit from the SNAP retail network disproportionately increase Black food retail worker separations relative to White workers? **Policy mechanism:** SNAP retailer composition shifted from supermarkets (27% to 16% share) to convenience stores (38% to 45% share) between 2005 and 2024, driven by corporate chain bankruptcies, stocking rule enforcement, and market consolidation. Supermarkets employ more workers at higher wages than convenience stores, so the composition shift destroys jobs — particularly among Black workers who occupy a disproportionate share of lower-seniority supermarket positions. **Outcome definition:** Quarterly separation rate (separations / beginning-of-quarter employment) and log employment in NAICS 445 (Food and Beverage Stores), disaggregated by race. **Treatment:** Binary; equals one in the quarter a county first experiences a SNAP supermarket-class retailer exit and all subsequent quarters. **Data:** Census LEHD Quarterly Workforce Indicators (QWI) for NAICS 445, county × quarter × race, 2010–2024, merged to USDA FNS SNAP Retailer Historical Database (703,441 retailers). 1.1 million county-quarter-race observations across 3,135 counties. **Method:** Race triple-difference (county FE + quarter FE + race FE + treated × Black), standard errors clustered at the county level. **Sample:** All U.S. counties with QWI NAICS 445 employment data for both White and Black workers; 2,628 treated counties (with $\geq$1 supermarket exit) and 507 never-treated counties. SDE = $\hat{\beta}$/SD(Y) where SD(Y) is the pre-treatment standard deviation. 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).