Disaggregated Heterogeneity in Inflation: K-Shaped Price Indices*

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Abstract

We study spatial heterogeneity in food inflation across counties in the New York metropolitan statistical area between 2006 and 2020. Using the NielsenIQ Retail Scanner data, we document a systematic gradient: the richest county, Manhattan, consistently experiences the lowest food inflation in the MSA. At the same time, Manhattan's share of total food sales rises steadily over the sample period. Because price indices are expenditure-weighted, this compositional shift places increasing weight on low-inflation areas. As a result, aggregate MSA-level inflation progressively understates the inflation experienced by the majority of households in the New York MSA. These findings suggest that aggregation bias in the presence of spatial heterogeneity in prices and expenditures may amplify measured divergence in economic outcomes across locations. This mechanism generates a widening gap between measured and experienced inflation, contributing to an increasingly pronounced K-shaped pattern of inflation across location and creating important welfare implications in both the short and long run.

Keywords: regional inflation; spatial inequality; food prices; aggregation bias

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Extended Abstract

Household inflation expectations are systematically upward-biased and disproportionately driven by food price changes (Weber et al., 2022). A key mechanism underlying this bias is heterogeneity in inflation experiences across households; however, most official price indices mask this variation by aggregating across consumers with markedly different income levels and consumption patterns.

In this paper, we address this gap by documenting within-MSA heterogeneity in food inflation in the New York City MSA, the largest metropolitan area in the United States. We show that Manhattan—the wealthiest county—consistently experiences the lowest food inflation over 2006-2020, while its share of total MSA food expenditure has risen over time. Because official price indices are expenditure-weighted, this compositional shift increasingly tilts the aggregate toward the inflation experience of high-income households. As a result, a growing share of households faces food inflation that exceeds what aggregate statistics report. Our findings provide micro-level evidence for a systematic divergence between measured and experienced inflation, offering a mechanism for why household inflation expectations remain persistently elevated relative to official measures.

To construct county-level food inflation rates, we use NielsenIQ Retail Scanner data spanning 2006–2020, which provide granular price and quantity information at the UPC-store-week level. This high-level of disaggregation allows us to track price changes for narrowly defined product categories across individual retail outlet, capturing local variation that is averaged out in standard national or regional-level indices. We follow Kim & Navarrete (2025) in constructing Laspeyres-type price indices, but depart from their approach in an important dimension: rather than aggregating from the MSA directly to the national level, we first construct indices at the county level before aggregating to the MSA. This bottom-up aggregation strategy is central to our analysis, as it recovers the intra-MSA distribution of food inflation and allows us to quantify how spatial variation in retailer market structure and household income shapes local price dynamics.

To measure county-level food inflation, we construct chained geometric Laspeyres price indices using lagged expenditure shares as weights and restricting attention to continuing goods sold in consecutive periods. This approach ensures that price changes are computed over comparable product baskets over time while preserving local expenditure patterns. Constructing indices at the

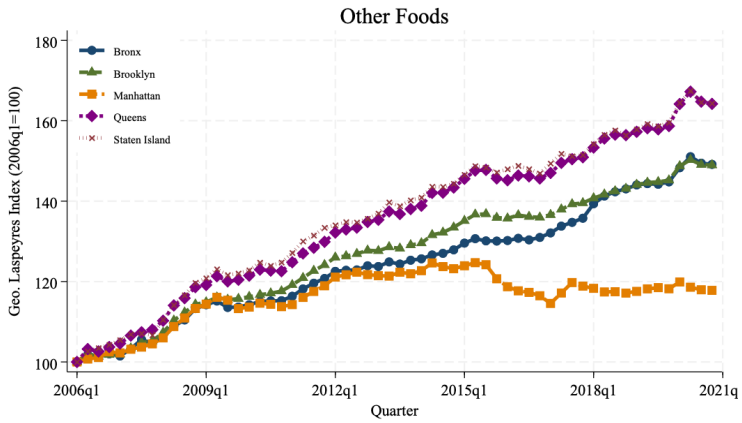


Figure 1: Price Index for Other Food

Notes: This figure plots the chained geometric Laspeyres price index for the PCE category Other Foods, constructed using NielsenIQ Retail Scanner data. The sample spans 2006Q1–2020Q4, with all series normalized to 2006Q1. Each line corresponds to one of the five New York City boroughs. UPCs are mapped to the PCE definition of Other Foods using a product module concordance provided by the U.S. Bureau of Labor Statistics.

county level allows us to uncover systematic differences in price growth across boroughs that would otherwise be obscured by standard MSA-level aggregation.

The log geometric Laspeyres price index, which is calculated as follows:

$$\ln \Psi_{ct}^{G} = \sum_{k \in \mathbb{C}_{c,t-1,t}} \omega_{ckt} \ln \frac{p_{ckt}}{p_{ckt-1}}, \tag{1}$$

where ω_{ckt} represents the weight assigned to product k in quarter t for county c, and we use lagged expenditure shares as weights, e.g., $\omega_{ckt} = s_{ckt-1}$. The set $\mathbb{C}_{c,t-1,t}$ includes all "continuing" goods, defined as products sold in both periods t and $t-1$ in county c.

Table 1: NYC Borough Population and Food Sales Shares, 2020

Borough	Population Share (ACS 2020)	Food Sales Share (2020 Q1)
Bronx	0.074	0.127
Brooklyn	0.138	0.304
Manhattan	0.086	0.260
Queens	0.121	0.239
Staten Island	0.025	0.070

Notes: Population shares are calculated from the 2020 ACS using IPUMS household weights. Food sales shares are computed from NielsenIQ retail scanner data for 2020Q1, summed across all PCE 21 food items.

Figure 1 illustrates these patterns for the largest expenditure-weighted food category, Other Foods. We find substantial divergence across boroughs: Manhattan experiences roughly 20 percent cumulative inflation between 2006 and 2020, while the remaining four boroughs experience more than 40 percent inflation over the same period. These differences are economically meaningful and persistent across food categories.

Because price indices are expenditure-weighted, boroughs with larger sales shares exert greater influence on aggregate inflation. As shown in Table 1, Manhattan accounts for approximately 26 percent of total food expenditures despite representing only 8.6 percent of the population. Moreover, Manhattan's expenditure share increases steadily over time, further amplifying its influence on the aggregate MSA inflation rate.

Taken together, these results imply that official MSA-level food inflation increasingly reflects the price experiences of high-income households in Manhattan rather than those of the typical household in the metropolitan area. As a result, most households face higher food inflation than suggested by aggregate statistics. This divergence does not represent a flaw in official measurement, but rather a mechanical consequence of expenditure-weighted aggregation in the presence of spatial heterogeneity in both prices and expenditures. Over time, this process generates an increasingly pronounced K-shaped pattern of inflation exposure, with high-income areas anchoring measured inflation while lower-income areas experience persistently higher price growth.

Ongoing work extends this analysis along three dimensions. First, we plan to construct household-weighted ("democratic") price indices following Martin (2024) and quantify the gap between expenditure-weighted and household-weighted inflation across locations. Second, we use this framework and assess how aggregation-induced distortions in regional price indices affect measured inequality and generate potentially misleading welfare comparisons across locations. Lastly, building on Kim & Navarrete (2025), we examine how disaggregated heterogeneity in inflation is shaped by local retail market structure and how it leads to differential propagation of shocks across regions.

References

Kim, Seula & Michael A. Navarrete (2025), "Geospatial Heterogeneity in Inflation: A Market Concentration Story," Working Paper 2025-15, Federal Reserve Bank of Atlanta, doi:10.29338/wp2025-15.

Martin, Robert S. (2024), "Democratic Aggregation: Issues and Implications for Consumer Price Indexes," *Review of Income and Wealth* n/a(n/a).

Weber, Michael, Francesco D'Acunto, Yuriy Gorodnichenko & Olivier Coibion (2022), "The Subjective

Inflation Expectations of Households and Firms: Measurement, Determinants, and Implications," *Journal of Economic Perspectives* 36(3): 157–84, doi:10.1257/jep.36.3.157.