National Neighborhood Data Archive (NaNDA): Grocery and Food Stores by Census Tract and ZCTA, United States, 1990-2021

Overview and Data Dictionary

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Dataset Overview

Description

This dataset contains measures of the number and density of grocery stores, supermarkets, food stores, fruit and vegetable stores, meat and fish markets, and warehouse clubs (such as Costco and Sams Club) selling food per United States Census Tract or ZIP Code Tabulation Area (ZCTA) from 1990 through 2021. The dataset includes four separate files for four different geographic areas (GIS shapefiles from the United States Census Bureau). The four geographies include:

- Census Tract 2010
- Census Tract 2020
- ZIP Code Tabulation Area (ZCTA) 2010
- ZIP Code Tabulation Area (ZCTA) 2020

Information about which dataset to use can be found in the Usage Notes section of this document.

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Data Sources

Business establishment data were taken from the National Establishment Time Series (NETS) database produced by Walls and Associates (2022) using archival establishment data from Dun & Bradstreet. NETS is a time-series database based on snapshots taken every January of the full Duns Marketing Information (DMI) file of over 80 million private for-profit and nonprofit establishments and government agencies. These snapshots used the DMI file to determine which establishments were active in January of each year from 1990 to 2021. This longitudinal data source classifies establishments by Standard Industrial Classification (SIC) code and provides detailed business microdata and address history (D. Walls & K. Perez, personal communication, October 4, 2022).

We determined each establishment's Census Tract or ZCTA for each year by mapping its latitude and longitude to the 2010 and 2020 TIGER/Line shapefiles from the US Census Bureau (United States Census Bureau, 2021a, 2021b). There are four versions of this dataset: Census Tract 2010, Census Tract 2020, ZCTA 2010, and ZCTA 2020. Each dataset is standardized to a single US Census geography; as a result, the variables are commensurable across all of the years in each dataset.

The population denominator for the per capita density variables came from the American Community Survey (ACS) or Decennial Census (United States Census Bureau, 2015a, 2015b, 2015c, 2016, 2017, 2020, 2023a). ACS data were used for available years; Decennial Census data were used when ACS data were not available (1990-2005, 2020-2021). A detailed description of the denominator used in the per capita density variables can be found in the Appendix of this document.

Data for the land area denominator came from the land area of the Census Tract or ZCTA from the 2010 or 2020 TIGER/Line shapefiles (United States Census Bureau, 2021a, 2021b). The IPUMS NHGIS crosswalks (Manson et al., 2023) were used to normalize data longitudinally.

Coverage

Each file contains one observation per Census tract or ZCTA in the fifty United States including Alaska and Hawaii and the US island territories.

Methodology

NETS Data Cleaning

Due to known limitations and inaccuracies in the NETS source data (Finlay et al., 2019; Hirsch et al., 2021; Kaufman et al., 2015), we followed a rigorous data cleaning protocol described in brief below (a more detailed, reproducible description of our NETS cleaning methodology is forthcoming).

Following Kaufman et al. (2015), we:

1. re-geocoded the NETS business addresses to increase geolocation accuracy,
2. assigned one SIC code to a given business throughout its existence in NETS to resolve inconsistencies in coding, and
3. collapsed multiple records for businesses in the same researcher-defined category, in the same year, and at the same location into a single record.

Additionally, we corrected errors due to businesses located at residential addresses by linking all business establishments to Zillow's ZTRAX data ("Zillow's Transaction and Assessment Database (ZTRAX)," 2023) to identify and remove businesses located in a residential parcel.

Variable Creation

After the NETS data were cleaned, we used SIC codes to identify grocery and food stores annually from 1990-2021 (*NAICS & SIC Identification Tools*, 2023). SIC codes were used to classify businesses by industry until they were replaced by NAICS codes in 1997. Using SIC codes allows for historical, longitudinal analysis with NETS data since 1990 (Hirsch et al., 2021).

We drew on our previously published NaNDA datasets to identify and categorize SIC codes for business types. In general, we focused on public-facing businesses. We also referred to the categories of SIC codes in Kaufaman et al. (2015) where appropriate. Our research team identified the following SIC codes representing grocery and food stores and grouped them into the categories listed below:

NaNDA category: Grocery Stores
(variables ending in "_grocery")
[Includes SIC: 54110000 54119901 54119902 54119903 54119904 54119905]

Establishments primarily engaged in the retail sale of food, including canned and dry goods, tea, coffee, spices, sugar, flour, fresh fruits and vegetables, fresh and prepared meats, fish, and poultry. Often (but not always) independent stores.

NaNDA category: Supermarkets

(variables ending in "_supermarkets")
[Includes SIC: 54110100 54110101 54110102 54110103 54110104 54110105]

Establishments primarily engaged in the retail sale of food, including canned and dry goods, tea, coffee, spices, sugar, flour, fresh fruits and vegetables, fresh and prepared meats, fish, and poultry. Often (but not always) chain stores.

NaNDA category: Meat and fish markets

(variables ending in "_meatfish")
[SIC: 54210000 54210100 54210101 54210102 54210200 54210201 54210202]

Establishments primarily engaged in the retail sale of fresh, frozen, or cured meats, fish, shellfish, and other seafoods, including bulk retail sale.

NaNDA category: Fruit and vegetable markets

(variables ending in "_fruitveg")
[SIC: 54310000 54319901 54319902]

Establishments primarily engaged in the retail sale of fresh fruits and vegetables; frequently found in public or municipal markets.

NaNDA category: Warehouse Clubs selling food

(variables ending in "_warehousefood")
[SIC: 53999906]

Warehouse club stores primarily engaged in the retail sale of dry goods, groceries, and other items.

NaNDA category: Total food stores

(variables ending in "_totalfoodstores")
[SIC: 54110000 54119901 54119902 54119903 54119904 54119905 54110100 54110101 54110102 54110103 54110104 54110105 54210000 54210100 54210101 54210102 54210200 54210201 54210202 54310000 54319901 54319902 53999906]

All of the above categories combined.

For each group of SIC codes we identified, we queried the NETS database for all establishments that were open at some time between 1990 and 2021 and their location during each year.

For each NaNDA category, we created four variables:

1. Count of the total number of establishments within a category in the tract or ZCTA (variables beginning with "count_").

2. Per capita density of the number of establishments within a category in the tract or ZCTA per 1000 population (variables beginning with "den_"). For tracts and ZCTAs with zero population in a given year, per capita density was set to missing.
3. Area density of the number of establishments within a category in the tract or ZCTA per square mile (variables beginning with "aden_").
4. Count of the total number of people employed in each category in the tract or ZCTA (variables beginning with "emps_").

Usage Notes

Choice of dataset (Census Tract 2010, Census Tract 2020, ZCTA 2010, or ZCTA 2020) depends on the geographic scale of interest and on the Census geography used in any linked dataset. For example, users should use the 2020 Census Tract data if they are linking NaNDA data with survey data that has geographic identifiers at the Census Tract based on 2020 geography. For survey data with geographic identifiers based on 2010 geography, users should use the 2010 Census Tract or ZCTA dataset.

Zip Codes and ZIP Code Tabulation Areas

Users should be aware that ZCTAs are not equivalent to ZIP codes. ZIP codes are linear mail delivery routes created by the US Postal Service. ZIP code tabulation areas are spatial features consisting of Census blocks grouped by the predominant ZIP code found on the block (United States Census Bureau, 2023b).

In some cases, a location's address is not the same as its ZCTA. For example, some ZIP codes represent single-point addresses such as large post offices or office buildings. Also, the ZIP code for an address may not match its ZCTA if the ZIP code is not the most common ZIP code on the block. See the Census Bureau's ZCTA overview (United States Census Bureau, 2022) for more information on how ZCTA boundaries are calculated.

Users wanting to combine this dataset with ZIP code geocoded data must use a ZIP code to ZCTA crosswalk. Such a crosswalk is available on the UDS Mapper website (John Snow, Inc, 2023). Sample code for merging the UDS Mapper crosswalk with NaNDA datasets is available in the ICPSR Linkage Library (Chenoweth & Khan, 2021).

Census Tract 2010 Variables

Variable	Type	Obs.	Unique	Mean	Min	Max	Label
tract_fips10	str11	2369088	74034	.	.	.	Census tract FIPS code, 2010
year	float	2369088	32	2005.50	1990	2021	Year
totpop	float	2339313	595279	4050.92	0	75506.54	Total population
aland10	float	2337792	72559	48.35	0	85425.73	Census land area, square miles
count_grocery	float	2369088	38	1.29	0	38.00	Total counts: Grocery stores
emps_grocery	float	2369088	1827	13.71	0	7445.00	Total employees: Grocery stores
den_grocery	float	2327632	433756	0.45	0	2011.90	Grocery stores per 1000 people
aden_grocery	float	2327648	168107	3.11	0	537.49	Grocery stores per sq mile
count_supermarkets	float	2369088	12	0.29	0	11.00	Total counts: Supermarkets
emps_supermarkets	float	2369088	1392	17.48	0	10050.00	Total employees: Supermarkets
den_supermarkets	float	2327632	164047	0.10	0	1000.00	Supermarkets per 1000 people
aden_supermarkets	float	2327648	45270	0.49	0	153.57	Supermarkets per sq mile
count_meatfish	float	2369088	18	0.16	0	17.00	Total counts: Meat and fish markets
emps_meatfish	float	2369088	417	0.76	0	1500.00	Total employees: Meat and fish markets
den_meatfish	float	2327632	110345	0.06	0	1000.00	Meat and fish markets per 1000 people
aden_meatfish	float	2327648	30619	0.43	0	242.97	Meat and fish markets per sq mile
count_fruitveg	float	2369088	48	0.09	0	49.00	Total counts: Fruit and vegetable markets
emps_fruitveg	float	2369088	526	0.42	0	900.00	Total employees: Fruit and vegetable markets
den_fruitveg	float	2327632	68601	0.04	0	1000.00	Fruit and vegetable markets per 1000 people
aden_fruitveg	float	2327648	18457	0.21	0	167.04	Fruit and vegetable markets per sq mile
count_warehousefood	float	2369088	6	0.02	0	5.00	Total counts: Warehouse Clubs selling food
emps_warehousefood	float	2369088	568	2.13	0	1950.00	Total employees: Warehouse Clubs selling food
den_warehousefood	float	2327632	16594	0.01	0	980.39	Warehouse Clubs selling food per 1000 people
aden_warehousefood	float	2327648	2999	0.01	0	32.98	Warehouse Clubs selling food per sq mile
count_totalfoodstores	float	2369088	77	1.85	0	97.00	Total counts: Total Food Stores
emps_totalfoodstores	float	2369088	3428	34.50	0	10050.00	Total employees: Total Food Stores

Variable	Type	Obs.	Unique	Mean	Min	Max	Label
den_totalfoodstores	float	2327632	517526	0.66	0	3736.39	Total Food Stores per 1000 people
aden_totalfoodstores	float	2327648	215755	4.26	0	759.28	Total Food Stores per sq mile

Census Tract 2020 Variables

Variable	Type	Obs	Unique	Mean	Min	Max	Label
tract_fips20	str11	2736896	85528	.	.	.	Census tract FIPS code, 2020
year	float	2736896	32	2005.5	1990	2021	Year
totpop	float	2707830	1012868	3501.88	0.00	39017.00	Total population
aland20	float	2732640	84776	41.41	0.00	85554.74	Census land area, square miles
count_grocery	float	2736896	38	1.12	0.00	38.00	Total counts: Grocery stores
emps_grocery	float	2736896	1777	11.87	0.00	7445.00	Total employees: Grocery stores
den_grocery	float	2686713	629799	0.51	0.00	5480.37	Grocery stores per 1000 people
aden_grocery	float	2721088	173252	2.93	0.00	733.33	Grocery stores per sq mile
count_supermarkets	float	2736896	12	0.25	0.00	11.00	Total counts: Supermarkets
emps_supermarkets	float	2736896	1352	15.13	0.00	10050.00	Total employees: Supermarkets
den_supermarkets	float	2686713	219363	0.13	0.00	2740.19	Supermarkets per 1000 people
aden_supermarkets	float	2721088	46032	0.47	0.00	153.56	Supermarkets per sq mile
count_meatfish	float	2736896	18	0.14	0.00	17.00	Total counts: Meat and fish markets
emps_meatfish	float	2736896	417	0.66	0.00	1500.00	Total employees: Meat and fish markets
den_meatfish	float	2686713	139677	0.07	0.00	1000.00	Meat and fish markets per 1000 people
aden_meatfish	float	2721088	31045	0.41	0.00	271.90	Meat and fish markets per sq mile
count_fruitveg	float	2736896	47	0.07	0.00	49.00	Total counts: Fruit and vegetable markets
emps_fruitveg	float	2736896	520	0.36	0.00	900.00	Total employees: Fruit and vegetable markets
den_fruitveg	float	2686713	81713	0.05	0.00	3653.58	Fruit and vegetable markets per 1000 people
aden_fruitveg	float	2721088	18688	0.20	0.00	169.39	Fruit and vegetable markets per sq mile
count_warehousefood	float	2736896	6	0.02	0.00	5.00	Total counts: Warehouse Clubs selling food
emps_warehousefood	float	2736896	558	1.85	0.00	1950.00	Total employees: Warehouse Clubs selling food

Variable	Type	Obs	Unique	Mean	Min	Max	Label
den_warehousefood	float	2686713	17931	0.02	0.00	980.39	Warehouse Clubs selling food per 1000 people
aden_warehousefood	float	2721088	3018	0.01	0.00	32.98	Warehouse Clubs selling food per sq mile
count_totalfoodstores	float	2736896	77	1.60	0.00	97.00	Total counts: Total Food Stores
emps_totalfoodstores	float	2736896	3322	29.87	0.00	10050.00	Total employees: Total Food Stores
den_totalfoodstores	float	2686713	758919	0.77	0.00	11874.14	Total Food Stores per 1000 people
aden_totalfoodstores	float	2721088	223468	4.02	0.00	794.44	Total Food Stores per sq mile

ZCTA 2010 Variables

Variable	Type	Obs	Unique	Mean	Min	Max	Label
zcta10	str5	1060608	33144	.	.	.	ZIP Code Tabulation Area, 2010
year	float	1060608	32	2005.5	1990	2021	Year
totpop	float	1055648	866462	8926.38	0.00	137755.50	Total population
aland10	float	1055648	32975	86.90	0.00	13467.65	ZCTA land area, square miles
count_grocery	float	1060608	170	3.04	0.00	191.00	Total counts: Grocery stores
emps_grocery	float	1060608	37500	32.15	0.00	7445.00	Total employees: Grocery stores
den_grocery	float	1051936	599797	0.65	0.00	13000.00	Grocery stores per 1000 people
aden_grocery	float	1055648	114081	0.78	0.00	1304.91	Grocery stores per sq mile
count_supermarkets	float	1060608	33	0.67	0.00	37.00	Total counts: Supermarkets
emps_supermarkets	float	1060608	11266	40.43	0.00	10145.00	Total employees: Supermarkets
den_supermarkets	float	1051936	308552	0.08	0.00	1587.30	Supermarkets per 1000 people
aden_supermarkets	float	1055648	36032	0.12	0.00	260.98	Supermarkets per sq mile
count_meatfish	float	1060608	40	0.38	0.00	41.00	Total counts: Meat and fish markets
emps_meatfish	float	1060608	3789	1.78	0.00	1506.00	Total employees: Meat and fish markets
den_meatfish	float	1051936	207229	0.07	0.00	5000.00	Meat and fish markets per 1000 people
aden_meatfish	float	1055648	24779	0.11	0.00	382.06	Meat and fish markets per sq mile
count_fruitveg	float	1060608	54	0.20	0.00	78.00	Total counts: Fruit and vegetable markets
emps_fruitveg	float	1060608	2333	0.98	0.00	902.00	Total employees: Fruit and vegetable markets

Variable	Type	Obs	Unique	Mean	Min	Max	Label
den_fruitveg	float	1051936	134221	0.04	0.00	4000.00	Fruit and vegetable markets per 1000 people
aden_fruitveg	float	1055648	16156	0.05	0.00	260.98	Fruit and vegetable markets per sq mile
count_warehousefood	float	1060608	6	0.04	0.00	5.00	Total counts: Warehouse Clubs selling food
emps_warehousefood	float	1060608	774	4.81	0.00	1950.00	Total employees: Warehouse Clubs selling food
den_warehousefood	float	1051936	37683	0.00	0.00	1000.00	Warehouse Clubs selling food per 1000 people
aden_warehousefood	float	1055648	2970	0.00	0.00	101.23	Warehouse Clubs selling food per sq mile
count_totalfoodstores	float	1060608	219	4.34	0.00	242.00	Total counts: Total Food Stores
emps_totalfoodstores	float	1060608	82186	80.15	0.00	10155.00	Total employees: Total Food Stores
den_totalfoodstores	float	1051936	639516	0.84	0.00	23000.00	Total Food Stores per 1000 people
aden_totalfoodstores	float	1055648	136687	1.07	0.00	1304.91	Total Food Stores per sq mile

ZCTA 2020 Variables

Variable	Type	Obs	Unique	Mean	Min	Max	Label
zcta20	str5	1081312	33791	.	.	.	ZIP Code Tabulation Area, 2020
year	float	1081312	32	2005.5	1990	2021	Year
totpop	float	1080768	920664.00	8745.35	0.00	135256.00	Total population
aland20	float	1081312	33779.00	83.58	0.00	13678.38	ZCTA land area, square miles
count_grocery	float	1081312	163.00	2.98	0.00	188.00	Total counts: Grocery stores
emps_grocery	float	1081312	37573.00	31.54	0.00	7445.00	Total employees: Grocery stores
den_grocery	float	1072868	612168.00	0.67	0.00	3333.33	Grocery stores per 1000 people
aden_grocery	float	1081312	115069.00	0.79	0.00	1919.93	Grocery stores per sq mile
count_supermarkets	float	1081312	33.00	0.66	0.00	37.00	Total counts: Supermarkets
emps_supermarkets	float	1081312	11318.00	39.67	0.00	10145.00	Total employees: Supermarkets
den_supermarkets	float	1072868	310673.00	0.07	0.00	1000.00	Supermarkets per 1000 people
aden_supermarkets	float	1081312	36429.00	0.11	0.00	239.70	Supermarkets per sq mile
count_meatfish	float	1081312	36.00	0.37	0.00	35.00	Total counts: Meat and fish markets
emps_meatfish	float	1081312	3790.00	1.75	0.00	1506.00	Total employees: Meat and fish markets

Variable	Type	Obs	Unique	Mean	Min	Max	Label
den_meatfish	float	1072868	208302.00	0.06	0.00	1000.00	Meat and fish markets per 1000 people
aden_meatfish	float	1081312	24888.00	0.10	0.00	382.06	Meat and fish markets per sq mile
count_fruitveg	float	1081312	54.00	0.20	0.00	78.00	Total counts: Fruit and vegetable markets
emps_fruitveg	float	1081312	2338.00	0.97	0.00	902.00	Total employees: Fruit and vegetable markets
den_fruitveg	float	1072868	134862.00	0.04	0.00	1000.00	Fruit and vegetable markets per 1000 people
aden_fruitveg	float	1081312	16234.00	0.05	0.00	210.62	Fruit and vegetable markets per sq mile
count_warehousefood	float	1081312	6.00	0.04	0.00	5.00	Total counts: Warehouse Clubs selling food
emps_warehousefood	float	1081312	774.00	4.72	0.00	1950.00	Total employees: Warehouse Clubs selling food
den_warehousefood	float	1072868	37933.00	0.01	0.00	683.25	Warehouse Clubs selling food per 1000 people
aden_warehousefood	float	1081312	2991.00	0.00	0.00	101.23	Warehouse Clubs selling food per sq mile
count_totalfoodstores	float	1081312	215.00	4.26	0.00	238.00	Total counts: Total Food Stores
emps_totalfoodstores	float	1081312	82173.00	78.65	0.00	10155.00	Total employees: Total Food Stores
den_totalfoodstores	float	1072868	653649.00	0.84	0.00	4000.00	Total Food Stores per 1000 people
aden_totalfoodstores	float	1081312	137935.00	1.06	0.00	1919.93	Total Food Stores per sq mile

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Appendix

Population Denominators for the Per Capita Density Variables

Years	Data Sources	Interpolated by year
1990-2000	• 1990 Decennial Census • 2000 Decennial Census	Yes
2001-2004	• 2000 Decennial Census • 2005-2009 American Community Survey	Yes
2005-2009	• 2005-2009 American Community Survey	No
2010-2014	• 2010-2014 American Community Survey	No
2015-2019	• 2015-2019 American Community Survey	No
2020-2021	• 2020 Decennial Census	No

Land Area Denominators

All data were downloaded, normalized, and standardized to four geographic levels using IPUMS NHGIS tools (Manson et al., 2023).

Census Tract 2010
Total population data for 1990-2009 and 2020-2021 census tracts were normalized to 2010 geography using IPUMS NHGIS crosswalks. (Data for 2010-2019 were collected using 2010 geography and therefore were not normalized.)

Census Tract 2020
Total population data for 1990-2009 census tracts were normalized to 2010 geography and again normalized to 2020 geography using IPUMS NHGIS crosswalks. Data for 2010-2019 were normalized to 2020 geography using IPUMS NHGIS crosswalks. (Data for 2020-2021 were collected using 2020 geography and therefore were not normalized.)

ZCTA 2010

Total population data at the ZCTA geographic level that had been standardized to 2010 geography from the 1990, 2000, 2010, and 2020 censuses were downloaded from the time series tables feature on the IPUMS NHGIS Data Finder.

ZCTA 2020

Total population data at the Census Block level were downloaded from the IPUMS NHGIS Data Finder for the 1990, 2000, 2010, and 2020 censuses. The 1990, 2000, and 2020 censuses were normalized to 2010 Census Blocks. (Data for the 2010 Census were collected using 2010 geography and therefore were not normalized.) The data were then normalized to 2020 Census Blocks using IPUMS NHGIS crosswalks, which were finally aggregated to the geographic boundaries for ZCTA 2020.