

# Consumption Zones

*BEA Advisory Committee Meeting, May 10, 2024*

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# Joint work between researchers in OCE and REA

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Big data for new, improved or more detailed statistics



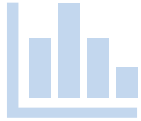
Consumption flows information



Applications for consumption zones



**Local area data important to many economic questions**



**Counties are finest available units for many data**



**Alternative geographical boundary definitions exist:**

Core-Based Statistical Areas (CBSAs)

Commuting Zones (CZ)

- Use commuting patterns as source data
- Good for labor market questions



**New Measure:  
Consumption zones**



**Consumption Zones**

Geographic regions suitable for studying spending/consumption

County sales flow data based on card transaction data

Retail sales and services consumption may have different geographic markets

## Aggregate Consumption Zones (ConZs) smaller than Commuting Zones (CZ)

- 1,235 ConZs
- 810 CZs

## Different industries have very different size zones

- Food stores: 1,862 ConZs
- Live entertainment: 322 ConZs
- Frequent purchases much more local than infrequent

## In application, market concentration lower with ConZ than political units:

- Gap biggest with infrequent purchases
- Most ConZ Herfindahl-Hirschman Index (HHI) are below antitrust scrutiny thresholds

# Outline of Presentation

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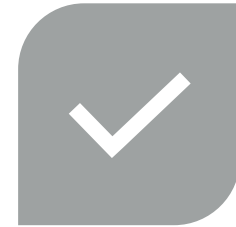
Clustering  
methodology



Consumption  
data



Consumption  
zone estimates



Application to  
concentration  
measures



Similar to geographic clustering method used in calculations of commuting zones (CZs)

- Calculated through iterative process
- Use cross-county consumption flows
  - Start with initial clustering: Each county a cluster
  - Calculate how “close” each cluster is to all other counties: Most cross-county flows, scaled by total sales
  - Join two “closest” clusters into new cluster
  - Repeat until all clusters are above a predetermined distance (“height”)
- Set height to 90% of consumption in-zone



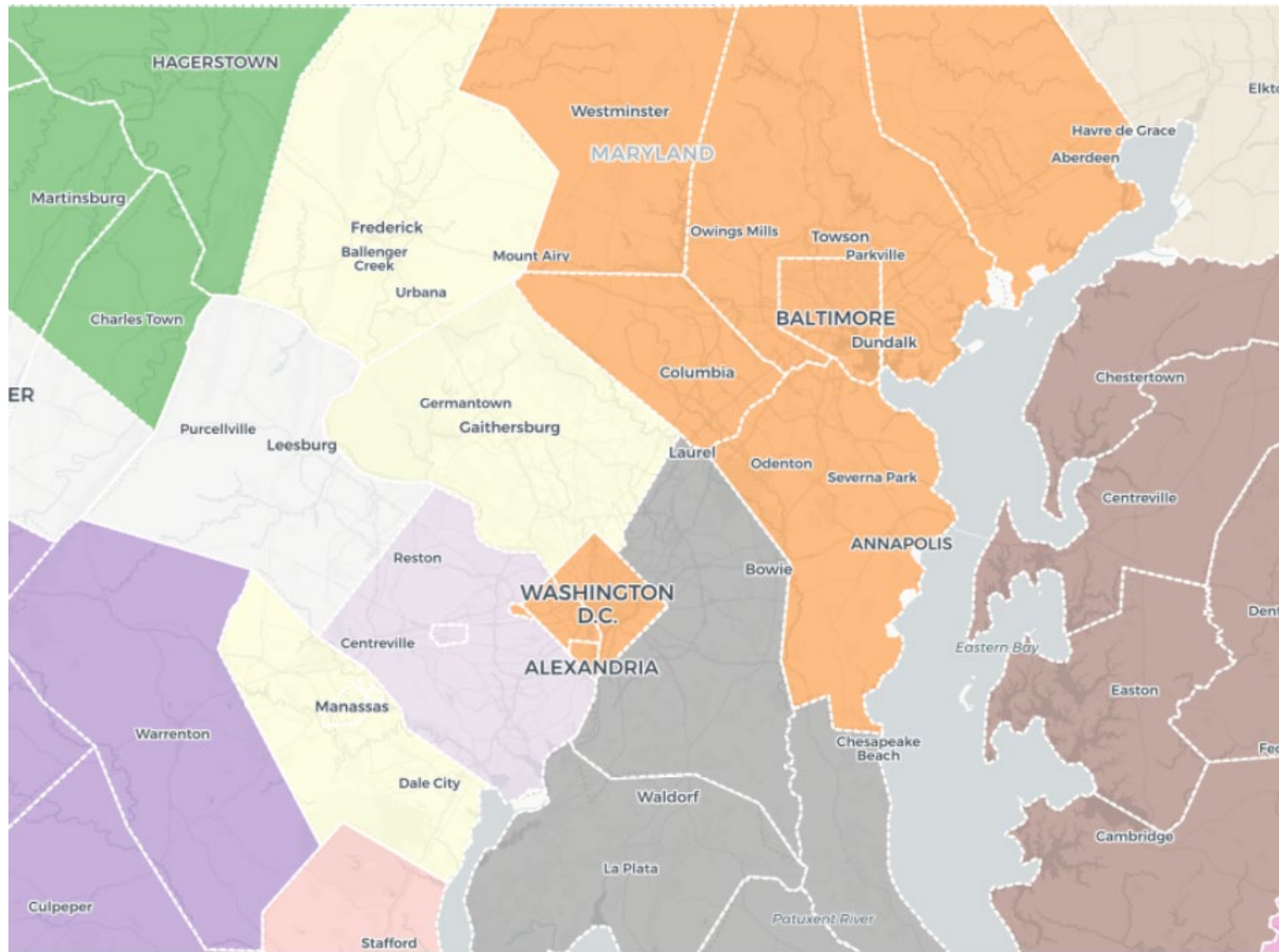
- Data source: Fiserv.
  - Fiserv processes approximately \$2 trillion dollars of card transactions for US establishments.
  - Information about credit, debit, and prepaid gift cards; all card networks (e.g. Visa, MasterCard, Discover).
- Data structure: Flows by industry.
  - County-by-county flows: The level of spending by residents from one county in all other counties.
  - Three-digit North American Industry Classification System (NAICS) industries.
- Some data suppressed for confidentiality: few outlets/transactions.
  - Impute missing flows with unsuppressed flows, distance, population (Dunn & Gholizadeh 2023).
  - Most imputed: Live entertainment, building supplies, general merchandise.



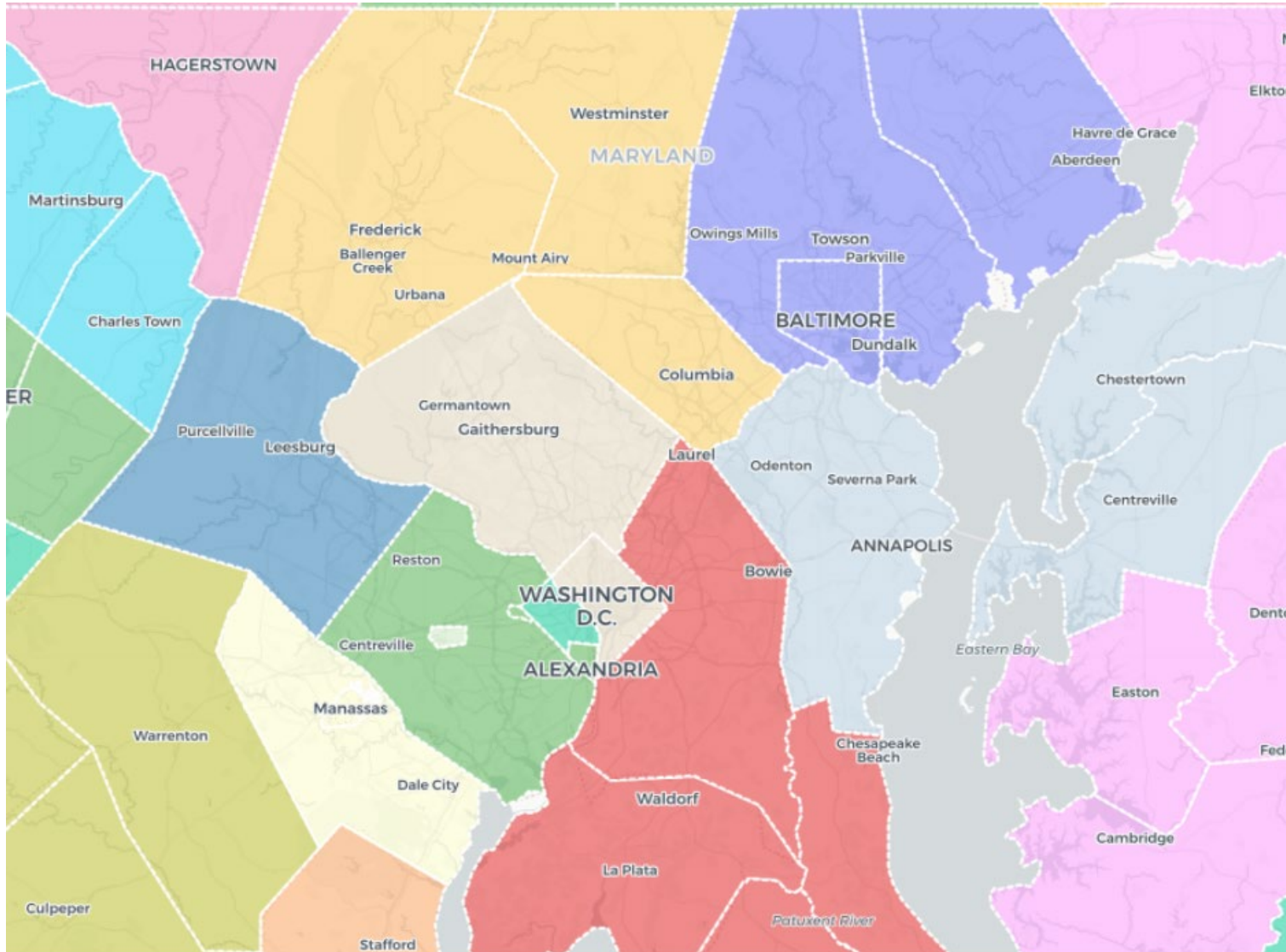
# Consumption Zone Counts by Industry

Industry	Num. of Zones	Land Area (Sq. Miles) Mean	Population Mean	Share ConZ Crossed by CZ	Share CZ Crossed by ConZ
Commuting Zone	810	4,348	396,737	0	0
<b>All Included Industries</b>	<b>1,235</b>	<b>2,851</b>	<b>260,208</b>	<b>0.265</b>	<b>0.584</b>
Furniture and Home Furnishings Stores	570	6,178	563,784	0.553	0.51
Building Material and Garden Equipment	1,194	2,949	269,143	0.291	0.591
Food and Beverage Stores	1,862	1,891	172,587	0.118	0.764
Gasoline Stations	972	3,623	330,614	0.462	0.579
Clothing and Clothing Accessories Stores	567	6,211	566,767	0.672	0.531
Sporting Goods, Hobby, and Book Stores	554	6,357	580,067	0.634	0.546
General Merchandise Stores	1,198	2,940	268,245	0.324	0.627
Miscellaneous Store Retailers	900	3,913	357,063	0.511	0.556
Ambulatory Health Care Services	800	4,402	401,696	0.512	0.52
Performing Arts, Spectator Sports, etc.	322	10,937	998,003	0.568	0.658
Amusement, Gambling, and Rec. Ind.	530	6,644	606,334	0.545	0.504
Accommodation	383	9,195	839,052	0.493	0.568
Food Services and Drinking Places	997	3,532	322,324	0.42	0.57
Repair and Maintenance	1,009	3,490	318,491	0.386	0.557
Personal and Laundry Services	955	3,687	336,499	0.464	0.556

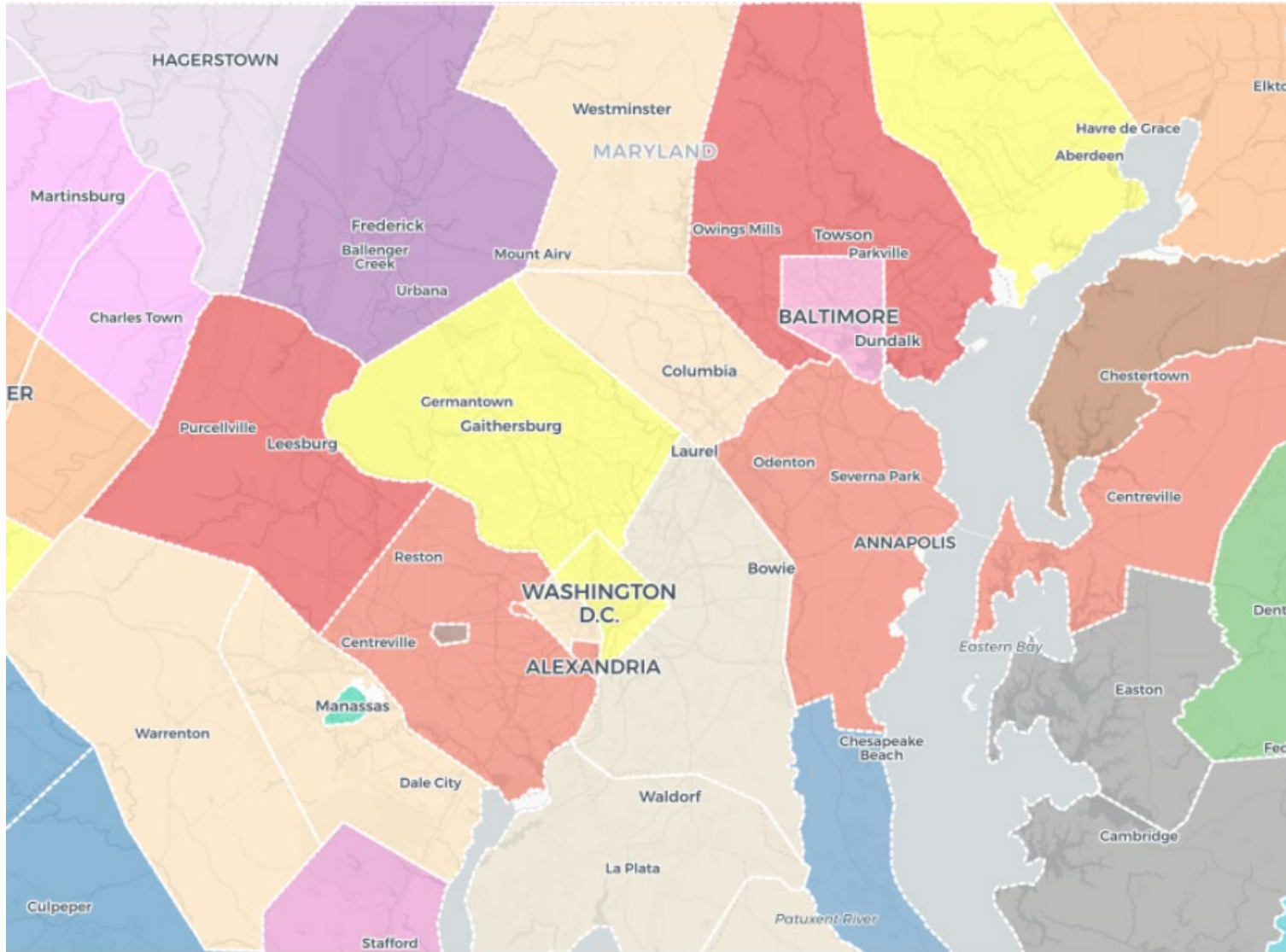
# Consumption Zone Estimates: Commuting Zones (For Comparison)



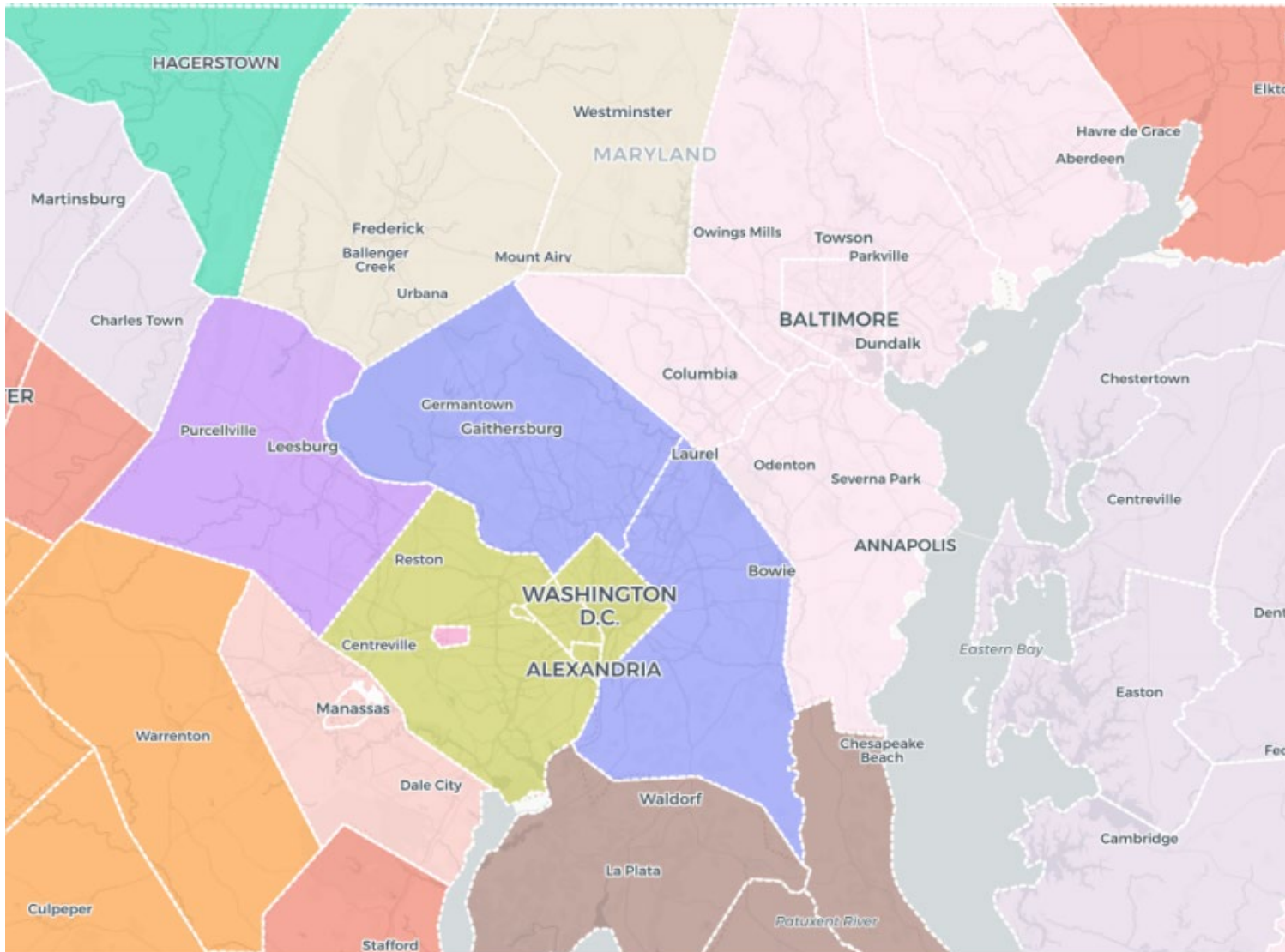
# Consumption Zone Estimates: Aggregate Consumption



# Consumption Zone Estimates: Food and Beverage Stores



# Map: Consumption Zones (Food Services and Drinking Places)





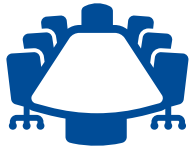
Aggregate Consumption Zones (1,235) smaller than  
Commuting Zones (810)

The size of the industry-specific consumption zones depends on  
the properties of the industry

- Industries w. frequent purchases have smaller geo areas (Agarwal, et al. 2020)
- Non-durable goods/personal services local
- Durable goods/entertainment much broader

Different activities give different cluster sizes AND geographical  
boundaries

- Consumption Zones are not just sub-zones of Commuting Zones
- Distribution of outlets may be very different: many offices in CBD, few stores



## Policy and Business

- Measuring market power and concentration.
- Compiling consumer market research.
- Predicting the effects of taxes or subsidies in an area.



## Research and Analysis

- Studying shocks to factors affecting consumption.
- Local economic shocks to income or wealth (many examples).



## Economic Statistics

- Local area price measurement



Market concentration significant area of inquiry



Retail/services consumed locally, need a measure of extent of market



Calculate Herfindahl-Hirschman Index (HHI)s for ConZs using National Establishment Time-Series (NETS) data

- HHI common, imperfect measure of market concentration
- Rossi-Hansberg et al. (2021) do similar exercise using political boundaries
- Smith & Ocampo (2022) do a similar exercise with CZs



# Application: Are the Differences Economically Meaningful?



Need metric to compare concentration results in an economically meaningful way



We use the 2010 DOJ Horizontal Merger Guidelines thresholds for HHIs

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Classify HHIs into three zones consistent with Guidelines (Nocke & Whinston 2020):

**Red Zone** Above 2500, concentrated, scrutiny likely

**Green Zone** Below 1500, un-concentrated, scrutiny unlikely

**Yellow Zone** Moderately concentrated



Input to actual regulatory activity, provides a policy relevant context



Guidelines not a rigid rule, much more goes into competition regulation

# Application: Table: Sales-Weighted HHIs

Industry	County	ConZ	State	County	ConZ	State
	1990	1990	1990	2019	2019	2019
Furniture (NAICS 442)	759	380	124	1,003	521	226
Building Material (NAICS 444)	1,069	664	160	2,471	2,009	1,463
Food Stores (NAICS 445)	1,141	934	350	2,095	1,920	1,129
Gasoline Stations (NAICS 447)	2,323	1,830	912	3,783	3,344	2,059
Clothing (NAICS 448)	485	290	134	668	440	243
Sporting Goods, Books (NAICS 451)	667	350	151	1,072	643	360
General Merchandise Stores (NAICS 452)	2,011	1,467	695	3,372	3,081	2,637
Misc. Store Retailers (NAICS 453)	637	343	70	970	655	294
Ambulatory (NAICS 621)	494	304	66	629	431	138
Performing Arts, Sports (NAICS 711)	1,761	882	399	1,683	891	559
Amusement (NAICS 713)	1,619	1,067	525	1,563	1,059	493
Accommodations (NAICS 721)	1,405	833	315	1,333	864	412
Food Service (NAICS 722)	276	153	30	198	117	42
Repair and Maintenance (NAICS 811)	571	379	138	571	378	88
Personal and Laundry Serv. (NAICS 812)	528	328	84	582	400	127

# Application: Findings: Concentration



Consumption Zones (ConZs) market concentration lower than counties



Counties/ConZs agree at the extremes

- Two industries firmly in Red Zone: General Merchandise/Gas Stations



Disagreement on some infrequent purchase industries

- Infrequent goods draw from large area
- Many counties have few outlets since other counties serve that market
- Performing Arts/Recreation: Green with ConZ/Yellow with counties



This is part of a cross-directorate effort to research non-standard or novel uses for alternative data including statistics on flows of spending across counties



Consumption zone statistics will be made available for data users on the BEA website (and a working paper link will be provided)



Looking forward, BEA plans to investigate other potential applications to spending flows data and for consumption zone information.



How might these zones be used in application?



How might these data be used to strengthen or combine with other BEA statistics?



What type of disaggregate geographic detail is most useful? More timely data? Industry detail? Geographic detail?

- Thank you!