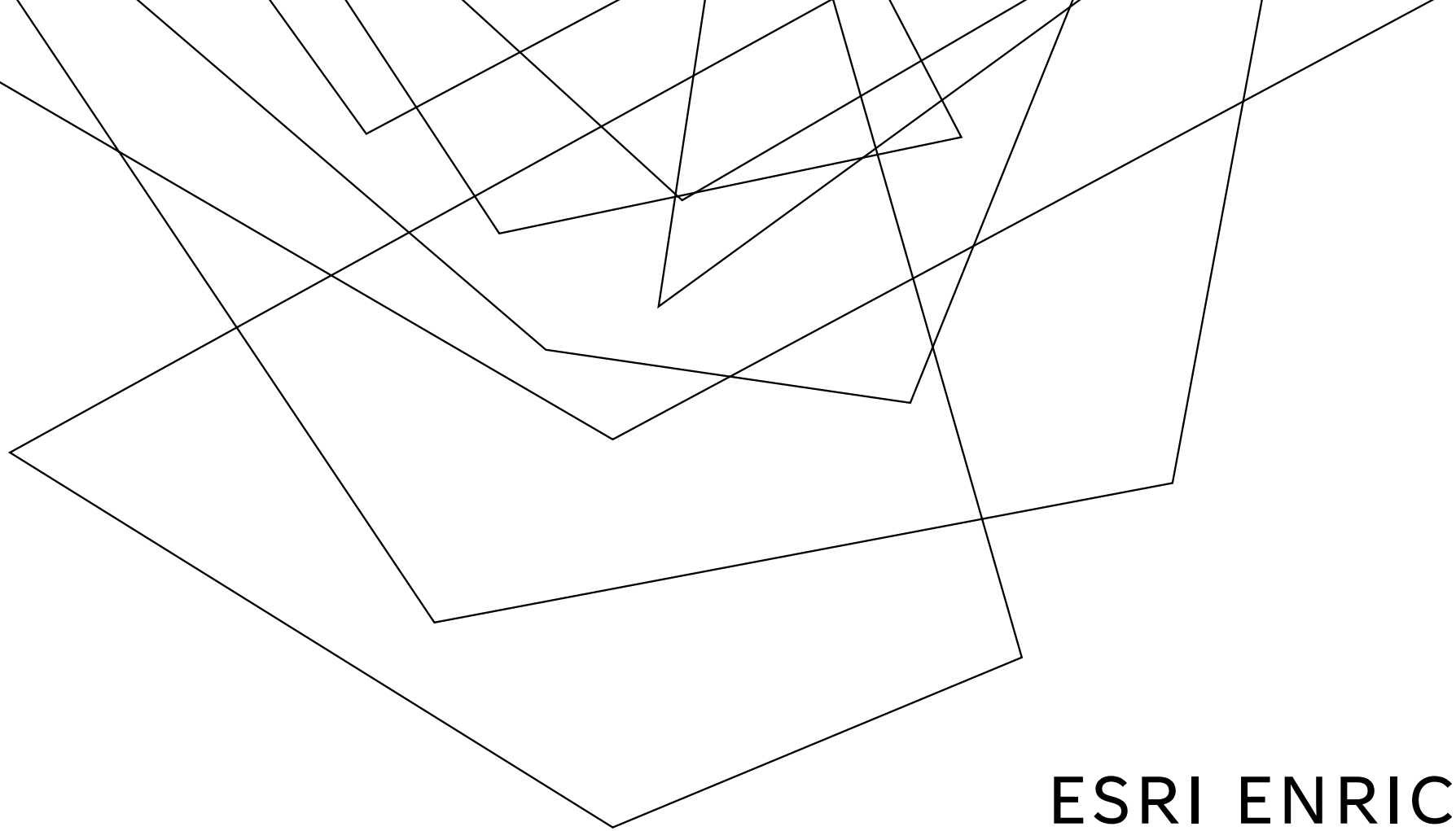
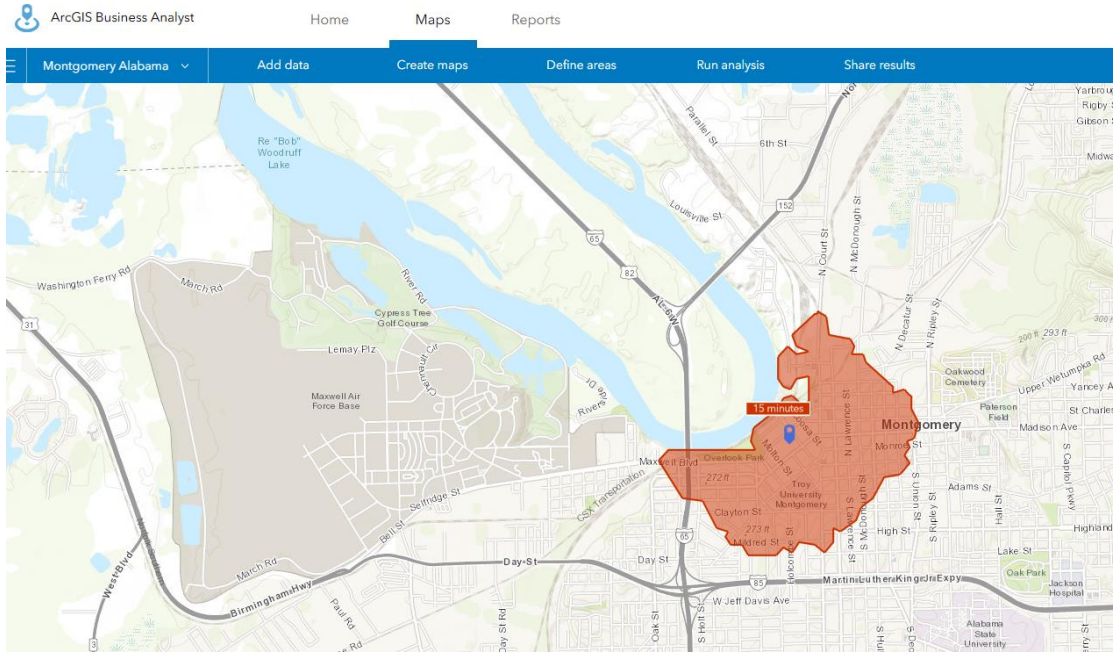
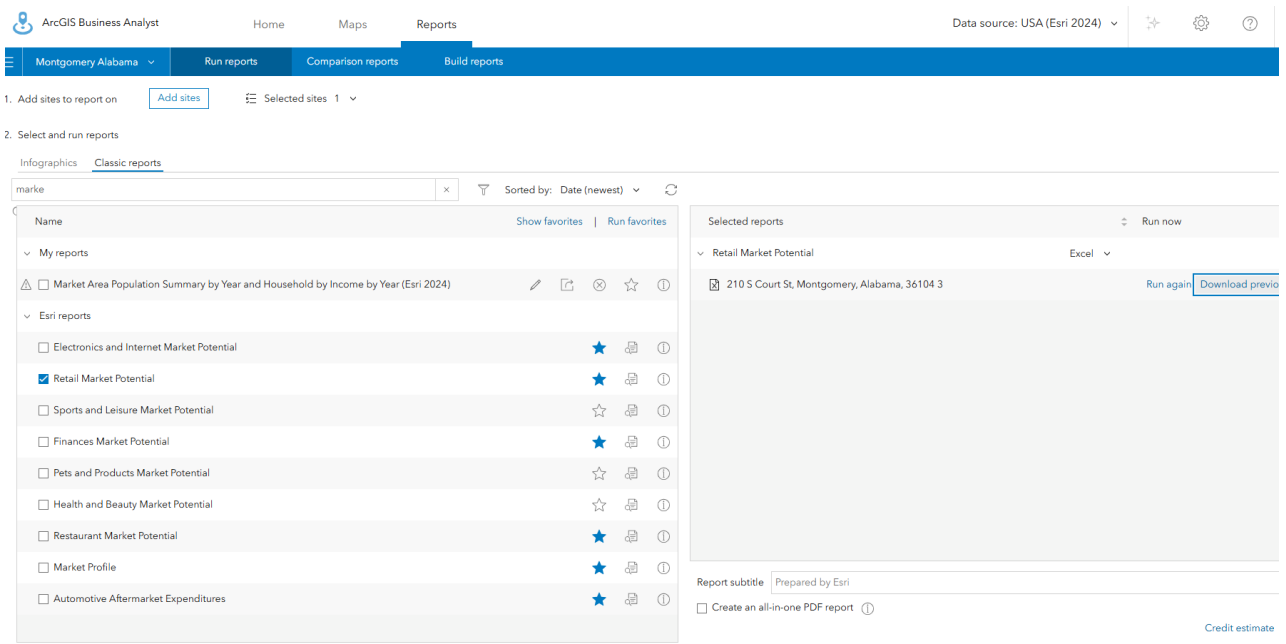


ESRI ENRICHMENT TOOL (BETA)

BACKGROUND: ESRI BUSINESS ANALYST ONLINE (BAO)

- https://bao.arcgis.com/esriBAO/index.html
  - An online platform for business and demographic analysis
  - Provides spatial enrichment data for selected sites
  - Generate reports per place/combined areas





CONTEXT

Difficulties when using BAO for TOD

- **Limited batch processing**
  - One location/area at a time
- **Cost-effectiveness**
  - 10 Esri Credits per report, potential high cost for batch processing (20 locations)
- **Manual data export/import**
  - Clean the data for analysis

esri
THE SCIENCE OF WHERE

Retail Market Potential

210 S Court St, Montgomery, Alabama, 36104 3
210 S Court St, Montgomery, Alabama, 36104
Drive time: 15, 30 minute radii
Latitude: 32.37464
Longitude: -86.30912

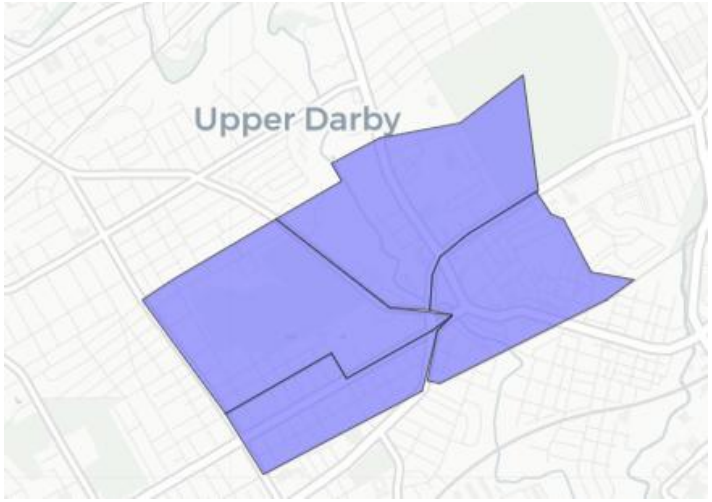
15 minutes			
	Demographic Summary	2024	2029
	Population	145,201	143,524
	Population 18+	114,165	113,890
	Households	60,745	60,517
	Median Household Income	$52,400	$57,813

15 minutes				
		Expected Number of	Percent of	
	Product/Consumer Behavior	Adults or HHs	Adults/HHs	MPI
	Apparel (Adults)			
	Bought Men`s Clothing/12 Mo	65,766	57.6%	91
	Bought Women`s Clothing/12 Mo	61,053	53.5%	102
	Bought Shoes/12 Mo	83,271	72.9%	97
	Bought Fine Jewelry/12 Mo	27,071	23.7%	109
	Bought Watch/12 Mo	16,806	14.7%	111
	Automobiles (Households)			
	HH Owns or Leases Any Vehicle	52,069	85.7%	95
	HH Bought or Leased New Vehicle/12 Mo	4,142	6.8%	74
	Automotive Aftermarket (Adults)			
	Bought Gasoline/6 Mo	98,541	86.3%	96
	Bought or Changed Motor Oil/12 Mo	60,669	53.1%	99

ACCESSING BAO USING SCRIPTS/API

Input: List of variables + shapefile

	name	alias
0	TOTPOP_CY	2024 Total Population
1	ACSTOTPOP	2022 Total Population (ACS 5-Yr)
2	AVGVAL_CY	2024 Average Home Value
3	ACSMEDVAL	2022 Median Home Value (ACS 5-Yr)



ArcGIS API for Python, GeoEnrichment Service

```
import geopandas as gpd
import pandas as pd
import os
from urllib.parse import unquote
from arcgis.gis import GIS
from arcgis.geoenrichment import enrich
from arcgis.features import GeoAccessor
from arcgis.geoenrichment import Country

# ArcGIS API key login
ARCGIS_API_KEY = "your_key"
gis = GIS(api_key=ARCGIS_API_KEY)

if gis.users.me is None:
    print("✅ Authenticated as: Anonymous user (API Key)")
else:
    print(f"✅ Authenticated as: {gis.users.me.username}")

country = Country("usa", gis=gis)
```

Output : .xlsx file for next step analysis

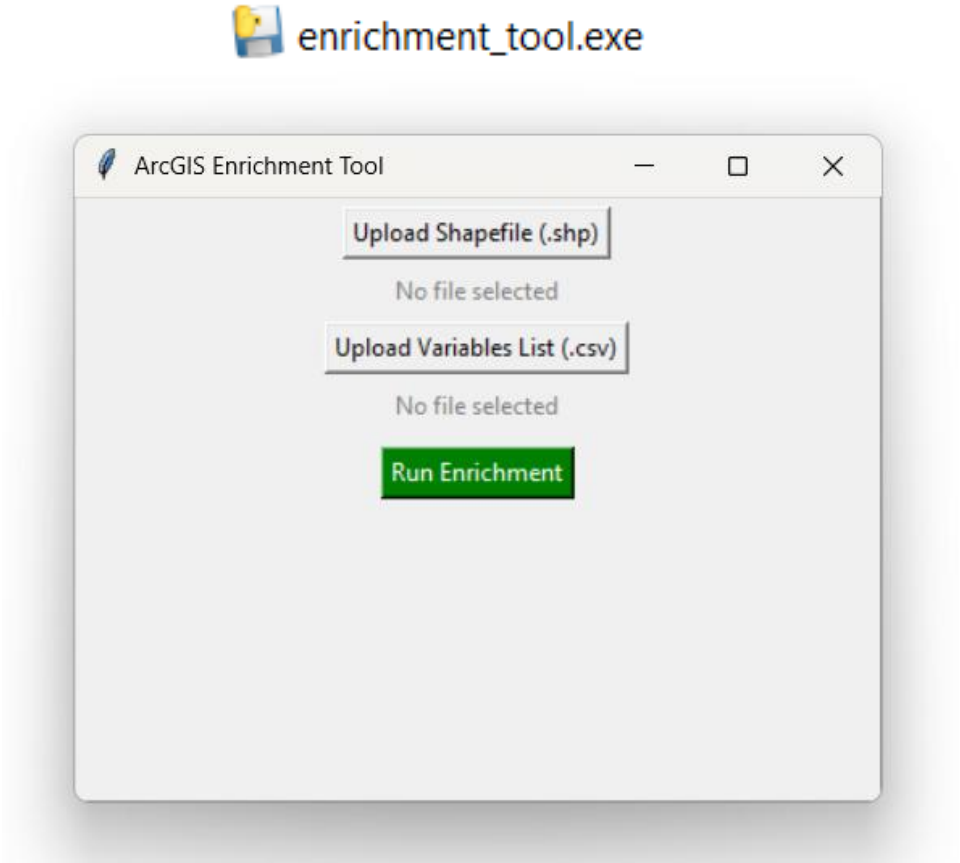
	A	M	N	O	P
	geoid	2024 Median Age	2024 Total Population	2024 Pop Age 25+:	2022 Total Housing Units
	42045403104	34.1	2452	200	934
	42045402600	35.9	3549	285	1255
	42045402500	33.3	3469	100	1465
	42045403103	38.4	2804	204	1276

SCRIPT-BASED ENRICHMENT TOOL AND DEMO

- **Using Python Scripts**

✅ Fully automated workflow
✅ Batch processing for multiple locations
✅ Customizable analysis

- **Credit Costs**
  - GeoEnrichment consumes credits based on data usage. 1,000 data variables = 10 credits --> 0.01 credit per data point
  - **Example:** 20 points/locations x 100 variables = 2,000 data variables = 20 credits



File Path on ESI's O drive: \\econha01\client\Arcgis Application

BEST PRACTICES AND CAVEATS FOR ENRICHMENT TOOL

- **Best Usage Scenario:** Batch processing and a set of variables is needed.
- **Data Availability:** Archive years are not always available in Esri Enrichment and BAO. Only the current year, the latest ACS 5-year data and 2010 & 2020 census data are available for certain variables.
- **Credits Usage:** Can not run the tool if credits run out.
- **Maximum Study Areas per Enrichment Request:** 100 locations, service limits may apply when processing large datasets.
- **API Expiration:** API access is only valid for one year and must be renewed annually.
- **Variable Selection:** Manual selection of variables beforehand, **DO NOT** run the whole variable database.
- **Report vs. API Differences: BAO** reports may show slightly different numbers due to customization options. BAO allows boundary generalization for performance, while GeoEnrichment strictly follows the shapefile boundary.
- Python scripts and colab notebooks are available if prefer adding data analysis steps before and after running enrichment tool.