STAT 381

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**Comparison between St. Cloud and Similar Cities in the Upper Midwest**

St. Cloud EDA

* Analysis Plan

Obtain American Community Survey data from IPUMS from 2012 to 2019.

Select demographic and economic variables.

Comparing (using 2010 PUMA & MSA FIPS coding):

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **City** | **PUMA10 Name** | **STATEFIPS** | **PUMA10** | **MSA Name** | **MSA FIPS** |
| St. Cloud, MN | Stearns County – St. Cloud City | 27 | 00900 | St. Cloud, MN MSA | 41060 |
| Rochester, MN | Olmsted County – Rochester City | 27 | 02500 | Rochester, MN MSA | 40340 |
| Duluth, MN | St. Louis County (Southeast)--Duluth, Hermantown & Proctor Cities | 27 | 00500 | Duluth, MN-WI MSA | 20260 |
| Mankato, MN | Blue Earth, Nicollet & Waseca Counties--Mankato City | 27 | 02200 | Mankato-North Mankato, MN MSA | 31860 |
| Fargo, ND | Cass County – Fargo City | 38 | 00500 | Fargo, ND-MN MSA | 22020 |
| Grand Forks, ND | Northeast North Dakota--Grand Forks City | 38 | 00400 | Grand Forks, ND-MN MSA | 24220 |
| Eau Claire, WI | Eau Claire & Chippewa (South) Counties | 55 | 55103 | Eau Claire, WI MSA | 20740 |
| La Crosse, WI | La Crosse County | 55 | 00900 | La Crosse-Onalaska, WI-MN MSA | 29100 |
| Dubuque, IA | Dubuque, Buchanan, Jackson & Delaware Counties--Dubuque City | 19 | 00700 | Dubuque, IA MSA | 20220 |
| Cedar Rapids, IA | Linn County--Cedar Rapids City | 19 | 01000 | Cedar Rapids, IA MSA | 16300 |

* Research Question

1. Demographic and Economic Characteristics of St. Cloud for businesses

HHINCOME:

PINCOME:

FAMSIZE: ave-high

MORTAMT1: one of the highest

RENTGRS: ave-low

TRANTIME: the highest

VALUEH: one of the highest

AGE: one of the lowest

UHRSWORK:

AVAILABLE:

AVAILLOOK:

HS:

COL: One of the lowest

LF: ave

EMP: ave

UMP: one of the highest

1. Unique Occupational Characteristics of St. Cloud

Major Classification

Architecture and Engineering (4) – JOBS & A\_MEAN

Life, Physical, and Social science (5) – JOBS

Community and social services (6) – JOBS & A\_MEAN

Protective Service (12) – JOBS & A\_MEAN

Food preparation and servicing related (13) – JOBS & A\_MEAN

Building and Grounds Cleaning and Maintenance (14) – A\_MEAN

Construction and Extraction (19) – JOBS

Installation, Maintenance, and Repair (20) – A\_MEAN

Production (21) – JOBS

Transportation and Material Moving (22) - JOBS

Low Quotient: Lowest 25% & At least 0.1% in St. Cloud (≈100 employment in the area)

First-Line Supervisors of Transportation and Material Moving Workers, Except Aircraft Cargo Handling Supervisors (4) – A\_MEAN

Landscaping and Groundskeeping Workers (5) – JOBS, A\_MEAN

High Quotient: Highest 25% & At least 0.1% in St. Cloud (≈100 employment in the area)

Bartenders (1) – JOBS

Heavy and Tractor-Trailer Truck Drivers (6) – JOBS

Licensed Practical and Licensed Vocational Nurses (8) – JOBS

Operating Engineers and Other Construction Equipment Operators (10) – JOBS

Plumbers, Pipefitters, and Steamfitters (12) – JOBS

Welders, Cutters, Solderers, and Brazers (18) - JOBS

1. Areas of improvements in St. Cloud

(variables that are significantly bad)

* Methodology

IPUMS: One-Way ANOVA with city means (of HH/Person) for each year 2017-2019

* Levene’s test for equal variance test
  + Equal (reject): Tukey’s HSD
  + Unequal: DTK (Dunnett’s Modified Tukey-Kramer Pairwise Multiple Comparison Test)
* Multiple Comparison
  + Tukey’s HSD, [DTK](https://cran.r-project.org/web/packages/DTK/DTK.pdf)
  + If St. Cloud has many significant differences in one direction, identify as a candidate for interesting factor.
  + If the factor is beneficial to competitiveness, then conclude as an interesting/competitive factor.
  + If the factor is negative to competitiveness, then conclude as an area of improvements.

LAUS: One-Way ANOVA with city means of 12 months for each year 2017-2020

* Same procedure as IPUMS

OEWS: Wilcoxon signed rank test

* Select sample cities using total employment of all occupation that falls into based on 2020
* Test for each tail & determine its significance.
  + Based on the tail direction, conclude as an competitive factor or an area of improvements.
* Data & Source
* IPUMS

**Steven Ruggles, Sarah Flood, Sophia Foster, Ronald Goeken, Jose Pacas, Megan Schouweiler and Matthew Sobek. *IPUMS USA: Version 11.0* [dataset]. Minneapolis, MN: IPUMS, 2021.**<https://doi.org/10.18128/D010.V11.0>

* Quantitative Variables

HHINCOME: Total household income <https://usa.ipums.org/usa-action/variables/HHINCOME#codes_section>

INCTOT: total personal income <https://usa.ipums.org/usa-action/variables/INCTOT#codes_section>

FAMSIZE: number of own family members in hh <https://usa.ipums.org/usa-action/variables/FAMSIZE#codes_section>

MORTAMT1: first mortgage payment <https://usa.ipums.org/usa-action/variables/MORTAMT1#description_section>

RENTGRS: gross rent <https://usa.ipums.org/usa-action/variables/RENTGRS#description_section>

TRANTIME: travel time to work <https://usa.ipums.org/usa-action/variables/TRANTIME#codes_section>

VALUEH: house value <https://usa.ipums.org/usa-action/variables/VALUEH#codes_section>

AGE

UHRSWORK: usual hours worked per week <https://usa.ipums.org/usa-action/variables/UHRSWORK#codes_section>

* Categorical Variables

LOOKING: looking for work <https://usa.ipums.org/usa-action/variables/LOOKING#codes_section>

AVAILABLE: available for work <https://usa.ipums.org/usa-action/variables/AVAILBLE#codes_section>

Find proportions of Available, and Available and Looking to work population

EDUC: educational attainment <https://usa.ipums.org/usa-action/variables/EDUC#codes_section>

Recode: Not finished HS, Finished HS, Some College

HHTYPE: Household type <https://usa.ipums.org/usa-action/variables/HHTYPE#codes_section>

HCOVPUB: public health insurance coverage

1- without

2- with

SCHOOL: school attendance <https://usa.ipums.org/usa-action/variables/SCHOOL#codes_section>

DEGFIELD: field of degree <https://usa.ipums.org/usa-action/variables/DEGFIELD#codes_section>

EMPSTAT: employment status <https://usa.ipums.org/usa-action/variables/EMPSTAT#codes_section>

CLASSWKR: class of worker <https://usa.ipums.org/usa-action/variables/CLASSWKR#codes_section>

POVERTY: poverty status <https://usa.ipums.org/usa-action/variables/POVERTY#codes_section>

RIDERS: vehicle occupancy <https://usa.ipums.org/usa-action/variables/RIDERS#codes_section>

* Local Area Unemployment Statistics (LAUS ssamatab1)

<https://www.bls.gov/lau/metrossa.htm>

Variables: labor force, employment, unemployment rate

Area classification: FIPS code (may cover different areas)

* Occupational Employment and Wage Statistics (OEWS)

<https://www.bls.gov/oes/tables.htm> (listed for each year of May)

Area classification: same as LAUS

Notes: per area per occupation (need to remove unnecessary areas and choose what occupation to show)

OCC\_TITLE: occupation title

OCC\_GROUP: major or detailed

TOT\_EMP: estimated total employment (excludes self-employment)

JOBS\_1000: number of employments per 1000 jobs in the given MSA

LOC\_QUOTIENT: location quotient, (bigger: more condensed in the MSA)

H\_MEAN: mean hourly wage (max: 90 for 2012-2015, 100 for 2016-2020)

A\_MEAN: mean annual wage (max: 187200 for 2012-2015, 208000 for 2016-2020)