

Illinois Population News Analysis

NLP Summer 2022

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Executive Summary - Major Insights

- Illinois, along with other major states such as New York and California, has been experiencing negative population growth for the past few years, including 2017, 2018, 2019, and the record-breaking 2021.
- The population grows slightly in 2020 but it was not sustained the following year.
- This population issues are mostly narrated in a very political way by both Democratic and Republican parties to stir public opinion towards their opponents' actions or inactions.
- Some of the main reasons for the population decline are attributed to:
 - the rising crime,
 - high income taxes,
 - declining job market,
 - where they are all exacerbated by the COVID-19 pandemic crisis.
- There are some positive highlights from Illinois that hopefully can attract the businesses and residents back:
 - government effort to increase investment to boost job market (such as training, apprenticeship),
 - growing and stronger diversity within the communities,
 - continuous effort of health care improvement from Medicare allocation to programs such as Sidecar Health (note: information extracted from Named Entity Recognition findings)
- Accordingly, businesses may be attracted to the increased investment and residents may be attracted to the more vibrant communities and seeing government efforts to improve job opportunities.

Actionable Recommendations

- Government can possibly focus to improve on the areas which cause most people to flee the region:
 - **Crime:** balancing between short and long-term strategies for crime handling and prevention to curb the number of crimes over time
 - **Income Taxes:** introduce business incentives as a manifestation of optimal tax utilization
 - **Job market:** continuous investment to improve job market and supply vs. demand issues
 - **COVID-19:** recovery activities, improve health care program/ innovations
- Regarding the growing diversity, government can also focus more on **strengthening communities** and improve **health and safety** altogether.

Preprocessing: Article Clean-Up & Filtering

Data Source Profile

- 199,942 news articles
- All in English
- Title and Text
- Various topics on Illinois
- Period: Jan-Jul 2022

Filtering

By Title:

Titles containing 'Illinois' and 'population'

Removal

- Duplicates based on text contents
- Irrelevant titles (text content misposted as title)

Split & Explode:

By sentences (for further sentiment analysis)

Clean-Up

Text Clean-Up:

- Remove URL
- Remove newline
- Remove punctuation
- Remove stopwords for relevant word count

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 199942 entries, 0 to 199941
Data columns (total 4 columns):
 #   Column      Non-Null Count  Dtype  
---  --
 0   date        199942 non-null  datetime64[ns]
 1   language    199942 non-null  object 
 2   title       199942 non-null  object 
 3   text        199942 non-null  object 
dtypes: datetime64[ns](1), object(3)
memory usage: 6.1+ MB
```

Article distribution by month Jan-Jul 2022, exploded by sentences of selected 150 titles:

1	1073
2	456
3	593
4	283
5	1215
6	147
7	224

date	language	title	text
2022-05-29	english	About Greater Chicago Roofing - Wheaton Roof Installation	About Greater Chicago Roofing - Wheaton Roof Installation\nThe Basic Principles Of Greater Chicago Roofing - Wheaton Skylight Replacement\nTable of Contents [7 Simple Techniques For Greater Chicago Roofing - Wheaton Gutter Replacement](#content-section-0) [Some Known Questions About Wheaton Roofing.](#content-section-1) [The Of Greater Chicago Roofing - Wheaton](#content-section-2) [Getting The Greater Chicago Roofing - Wheaton Roof Installation To Work](#content-section-3) Move automobiles: You'll intend to leave a huge course on your driveway or car park for your roofers to come as well as go with materials. Moving vehicles to the opposite side of the car park or down the road will certainly likewise assist shield them from dropping debris. Determine outlets: One way you can help streamline the process is by recognizing one of the most hassle-free electrical outlets beforehand for your roofing professionals to gain access to for power tools.\n[7 Simple Techniques For Greater Chic...

~200k Articles → 150 Selected Titles → 2710 Exploded by Sentences without Duplication → 2536 Sentences without Irrelevant Long Titles

Topic Detection: LDA with ktrain

Non-Filtered Text (without probability threshold)

Top-ranked out of 316 topics (a lot of irrelevant topics detected)

topic:110	count:9376	white cubs sox game odds picks preview npr predictions prediction
topic:313	count:6332	illinois state death loans rep ohio loan payday photo fair
topic:279	count:6113	illinois nyse works tool shares itw fund llc retirement municipal
topic:117	count:5665	school illinois schools university high mask students college set mandate
topic:51	count:5525	com illinois news source liveuamap wsilTV officials latest january updates
topic:17	count:4905	bears second coach make nfl ryan head general matt poles
topic:58	count:4416	home illinois sale indiana restaurant april hits price homes missouri
topic:151	count:4409	bulls nba milwaukee cities bucks pick look lavine twin patrick
topic:298	count:4159	illinois watch covid-19 pritzker abortion care insurance auto gov florida
topic:257	count:4105	park illinois live wounded united highland injured states video street
topic:296	count:4022	new illinois york market update takes western opens heat signs
topic:107	count:3909	lawyers report illinois woman county cases accident dies truck deaths
topic:286	count:3581	man charged federal murder illinois charges prison trump sentenced accused
topic:260	count:3476	nbc trade change player photos blues security short come room
topic:278	count:3456	illinois sun-times basketball big loyalty farm summer record tournament ncaa
topic:194	count:3446	shooting july parade chicago-area hurt witness windows describes feared honda
topic:168	count:3300	roofing greater installation naperville wheaton metal rule minute skylight schauburg
topic:102	count:3294	season people return governor help episode illinois shows church go
topic:30	count:3265	illinois rental dumpster women times iowa river lincoln express buffalo
topic:191	count:2935	police department officers returns green stop mcdonald wirepoints illinois leaving
topic:96	count:2918	killed say illinois fired shots boy sky cop hit heard
topic:145	count:2906	mayor lightfoot crime race community office attorney lori fox suburban
topic:180	count:2899	service weather alert friday daily winter snow wisconsin saturday expected
topic:205	count:2820	illinois buy services residents pay emergency sales election results oil
topic:53	count:2682	tribune black days case makes party surge museum illinois risk
topic:45	count:2674	illinois wttw past news local scores lead latino johnson carries
topic:189	count:2501	sports blackhawks league stream major like release sunday great illustrated
topic:315	count:2448	near dispatchist south illinois just tax line list crash reports
topic:13	count:2333	illinois court gets following supreme hospital war continues released battle

Topic Detection: LDA with ktrain

Filtered Text with Duplication (probability threshold 0.55, result: 2 of 2 topics)

topic:0 | count:11 | new census actually chicago continues gain modest figures americans signs
topic:6 | count:7 | new york saw california drops historic census shrinking chicago growing

Filtered Text without Duplication (probability threshold 0.40, result: 2 of 2 topics)

topic:3 | count:7 | new census modest gain actually signs figures experts change warning
topic:6 | count:5 | chicago new york historic drops saw census counties wttw city

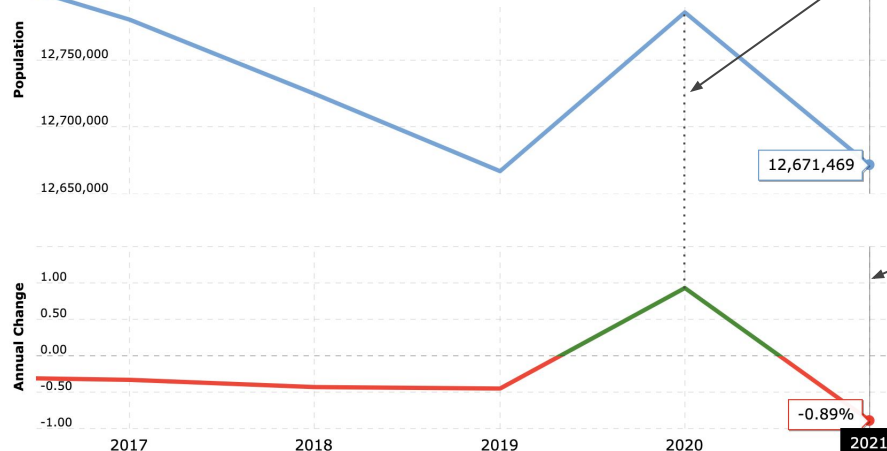
Two major topics through relevant articles:

1. Modest gain of population
2. Historic population drops

Which seem like two contradictory facts but actually in line with the real condition (refer to the population change graph).

We can also see that big cities / metropolitan areas similar like Chicago, Illinois experienced the same thing (like New York that was explicitly mentioned here, and also California when looking deeper into the articles).

- The population of Illinois in 2021 was 12,671,469, a 0.89% decline from 2020.
- The population of Illinois in 2020 was 12,785,245, a 0.93% increase from 2019.
- The population of Illinois in 2019 was 12,667,017, a 0.45% decline from 2018.
- The population of Illinois in 2018 was 12,724,685, a 0.43% decline from 2017.

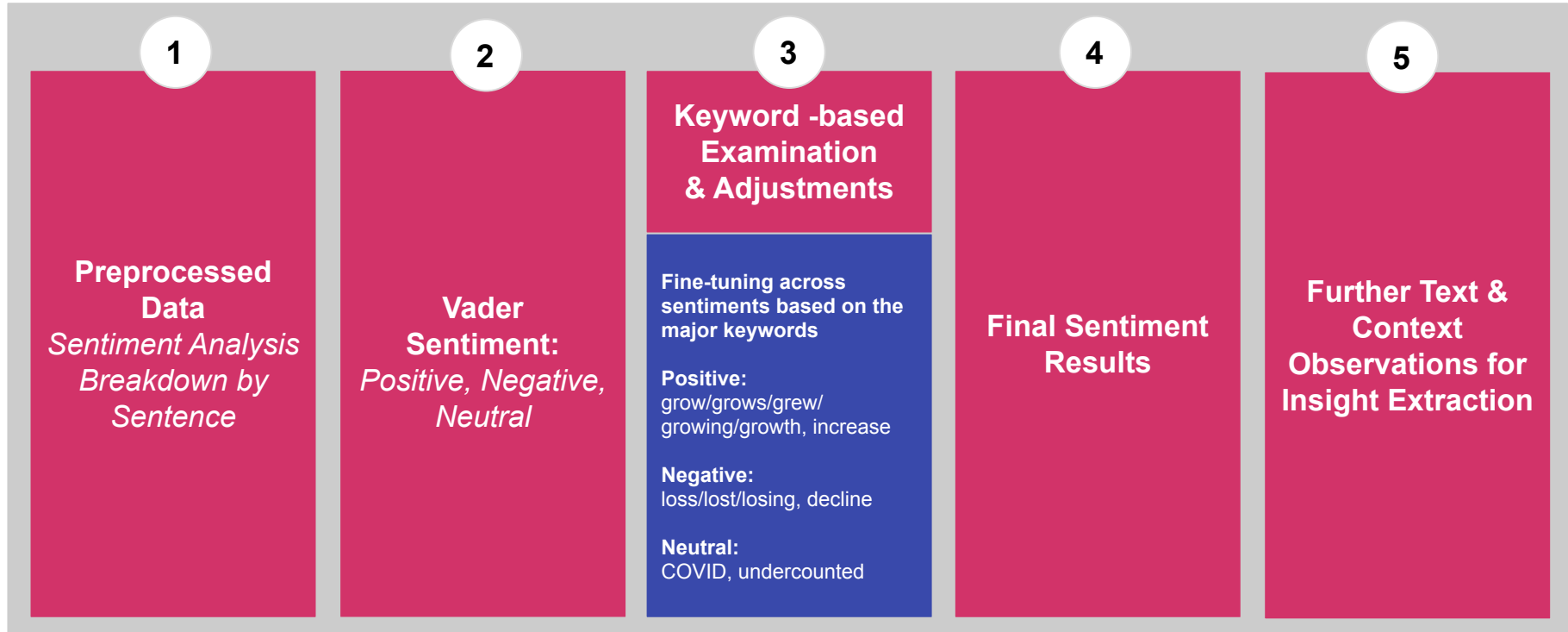


News Titles

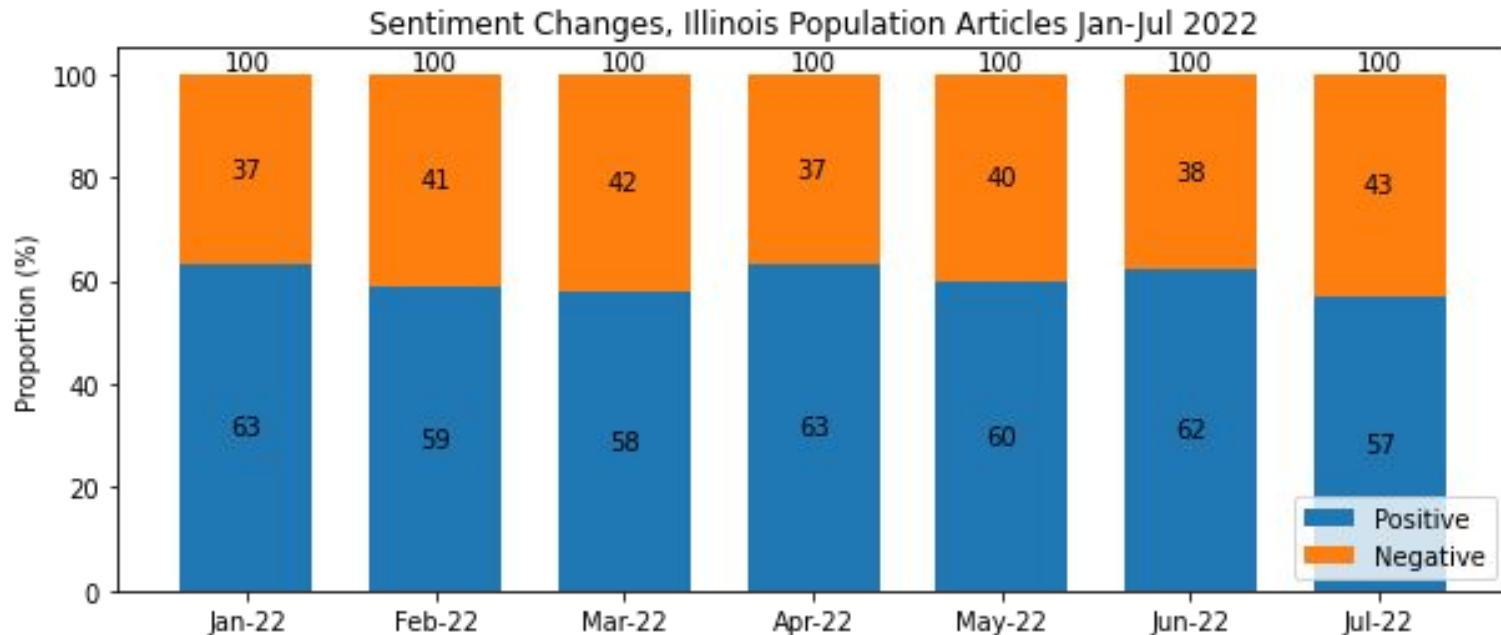
'New census figures show Illinois' population change was actually a modest gain, but experts say warning signs remain'

'New York, California, and Illinois Saw Historic Population Drops in 2021'

Sentiment Analysis Procedure



Sentiment Over Time

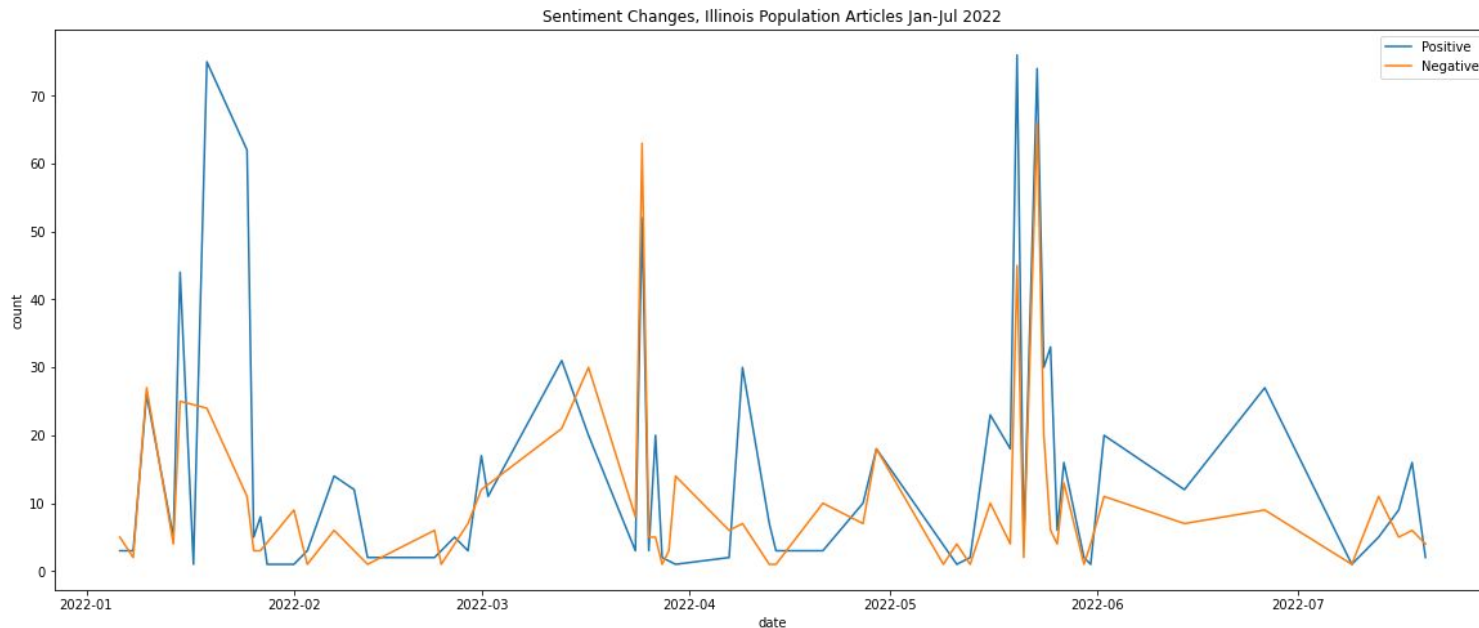


source: python notebook

By proportion/percentage, news articles about Illinois population are still dominated by positive sentiments within the range of 57%-63%. The gap can be considered not an extreme polarity, this can also be caused by the tendency of categorizing sentiment as positive by the algorithm.

By the end of the period (Jul-22) the articles seem to lean toward negative reviews more as it records the highest proportion of negative comments of 43%.

Sentiment Over Time

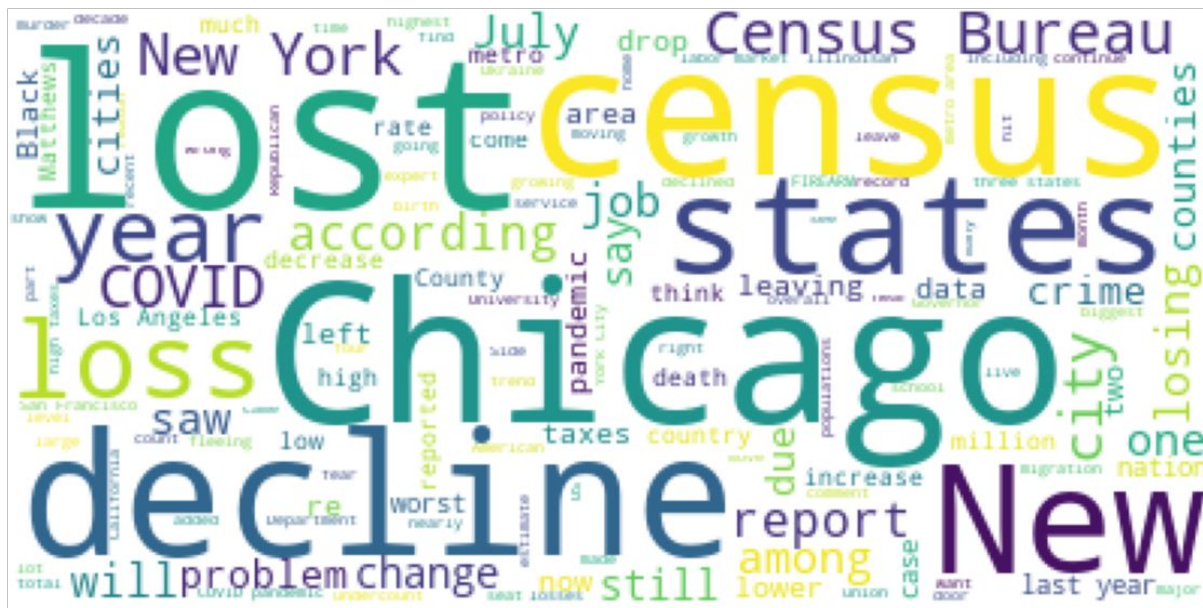


source: python notebook

By actual numbers, we can see that there are content spiking during the period between January-February 2022, late March 2022, and between May-June 2022.

The pattern of positive and negative seems to be consistent over time, except during end of March / early April 2022 where negative sentiments surpass the positive ones.

Negative Sentiments: Reasons to Leave Illinois



Top Words

```
[('lost', 84),  
 ('Chicago', 67),  
 ('census', 59),  
 ('decline', 52),  
 ('New', 52),  
 ('states', 51),  
 ('loss', 39),  
 ('year', 34),  
 ('Census Bureau', 33),  
 ('city', 30),  
 ('COVID', 30),  
 ('according', 28),  
 ('report', 28),  
 ('one', 25),  
 ('among', 25),  
 ('job', 25),  
 ('will', 24),  
 ('July', 24),  
 ('saw', 24)]
```

```
[('change', 23),  
 ('say', 23),  
 ('still', 22),  
 ('problem', 22),  
 ('counties', 22),  
 ('crime', 21),  
 ('cities', 21),  
 ('due', 20),  
 ('leaving', 20),  
 ('area', 20),  
 ('lower', 20),  
 ('two', 19),  
 ('taxes', 18),  
 ('left', 18),  
 ('now', 18),  
 ('Black', 18),  
 ('data', 18),  
 ('pandemic', 17),  
 ('drop', 17)]
```

People are leaving Illinois due to:

1. High crimes
2. High income taxes
3. Declining job market
4. Exacerbated by COVID-19/pandemic crisis

source: python notebook

Negative Sentiments: Reasons to Leave Illinois

High Crimes

"Those blue cities have also been in the headlines for the wrong reasons in recent years, thanks to soaring levels of violent crime blamed on progressive district attorneys and slashing of police budgets."

"They're talking about leaving because they're tired of crime, and they're tired of corruption," Irvin said.

"All those cities have been in the headlines in recent months due to draconian COVID lockdown measures and rising crime rates."

High Income Taxes

"The states with the highest personal income taxes, California, Hawaii, New Jersey and Illinois, experienced the most staggering population losses."

"People seem to be leaving to states with an improved business climate, lower taxes, and we would also say because that states with the worst government finances seem to be losing population the most," Weinberg said.

"It is also forcing them to pay the highest taxes in the Midwest."

Declining Job Market

"The exodus is likely caused by, among other things, losing young people to big cities and the loss of agricultural jobs to technology, experts said."

"Institute experts point out metro areas that lost population also saw lagging job recoveries, with the bulk of the state's missing jobs coming from Chicago."

"According to the report, Illinois added 262,600 jobs in 2021, but still lags the state's pre-pandemic employment level."

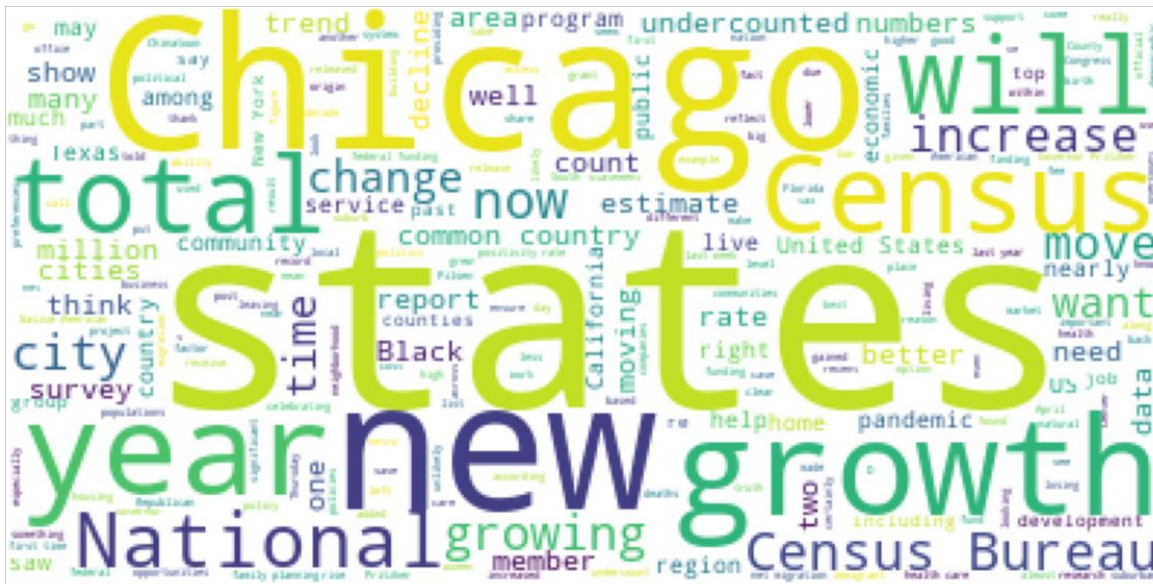
COVID-19/ Pandemic Crisis

"Lockdowns, documentation mandates, school closings, and other COVID regulations are likely just too cumbersome for some to tolerate."

"When Nuckolls left the Chicago area in July 2020, she was on the cusp of a trend: More than 100,000 people in Chicagoland followed suit over the next year, migrating to other domestic destinations during the COVID-19 pandemic."

"Now, with the impact of the COVID-19 pandemic, this combination has resulted in a historically slow pace of growth."

Positive Sentiments: Reasons to Stay in Illinois



```
[('states', 68),
 ('Chicago', 67),
 ('new', 66),
 ('growth', 62),
 ('year', 57),
 ('Census', 54),
 ('will', 51),
 ('total', 51),
 ('National', 49),
 ('Census Bureau', 45),
 ('now', 44),
 ('city', 38),
 ('growing', 37),
 ('increase', 35),
 ('move', 35),
 ('change', 35),
 ('want', 34),
 ('time', 33),
 ('common country', 33),
 ('undercounted', 32)]

[( 'show', 30),
 ('think', 30),
 ('area', 29),
 ('need', 29),
 ('cities', 29),
 ('many', 29),
 ('data', 28),
 ('numbers', 27),
 ('estimate', 27),
 ('one', 27),
 ('survey', 25),
 ('better', 25),
 ('report', 25),
 ('moving', 25),
 ('count', 24),
 ('Black', 24),
 ('rate', 24),
 ('two', 23),
 ('well', 23)]
```

The growth that is mentioned in the text refers to the undercounting of Illinois population in 2020 that changes the record from population loss to a slight increase.

There seems to be a growing number of diversity in the population.

source: python notebook

Positive Sentiments: Reasons to Stay in Illinois

Undercounting Issues

'Illinois Undercounted in 2020 Census, Actually Grew to 13 Million – The State's Largest Population Ever'.

'New census figures show Illinois' population change was actually a modest gain, but experts say warning signs remain'

The population of Illinois is growing. The census showed it shrinking. It's one of six states significantly undercounted in 2020.

Growing Diversity

Refugees drive West Ridge's growing Asian population.

Native American population in Chicago grows, stronger community, more truthful history sought throughout city.

Census: Black Population Grows in Suburbs, Shrinks in Cities.

Chinatown Chicago: Why the ethnic enclave is growing as other cities' Chinatowns see Asian populations decline.

Rural Illinois has lost population over the past decade. It's gained in diversity.

After looking deeper into the texts, some efforts were made by the government of Illinois to attract new incoming population

Government Program:

- Increased investment/funding for training & apprenticeship
- Downtown revitalization

'Governor Pritzker Calls on Federal Government to Fund Illinois Based on Population Increase.'

'Increased investment by the Pritzker administration in training and apprenticeship programs in manufacturing and aviation have created jobs and attracted new residents across the state.'

'Jerseyville, Illinois, takes action to revitalize its downtown, aiming for small business growth and population gain'

'If that goal is achieved, among the results could be an increase in population by retaining more young people and attracting new residents to Jerseyville , officials said.'

source: python notebook

Organizations and Persons in Negative Articles



Pritzker	20
the U.S. Census Bureau	14
Congress	9
the 2020 Census	7
Sidcar Health	6
the Census Bureau	6
the US Census Bureau	6
GOP	6
White Bass	6
Wu	5
Biden	5
JB Pritzker	5
J.B. Pritzker	5
Census Bureau	5
Medicare	4
Weinberg	4
House	4
ICU	4
the Supreme Court	4
the Illinois Family Planning Program	4

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Organization

[illegible]

Governor **Pritzker** shows up the most as he is the government leader of Illinois.

Emanuel Chris Welch also shows up as he is the Speaker of the Illinois House of Representatives.

[illegible]

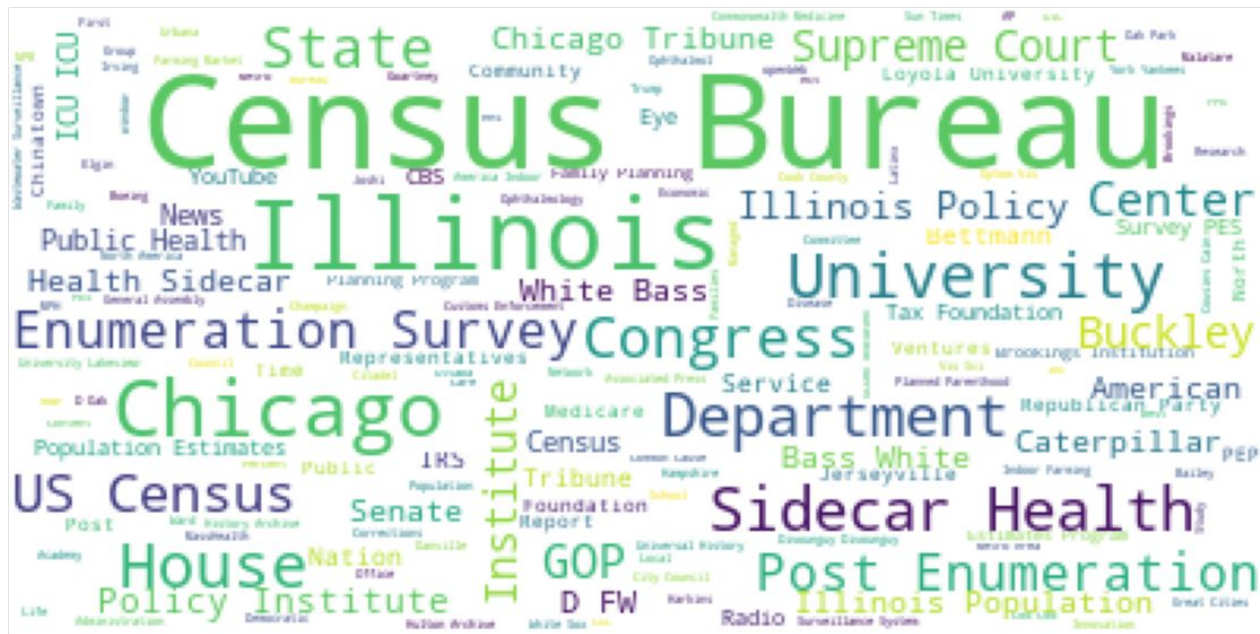
We can also see many **ethnicities** mentioned possibly with regards to the growing **diversity** in the population.

A word cloud visualization showing names associated with various US states. The largest words are Pritzker, Biden, Trump, and Johnson. Other prominent names include Chris, David, Josh, JB, Paul, Joe, and Elton. Smaller words include Robert, Emanuel, Chris, David, Josh, JB, Paul, Joe, Elton, and many others.

Emanuel Chris Welch also shows up as he is the Speaker of the Illinois House of Representatives.

Appendix

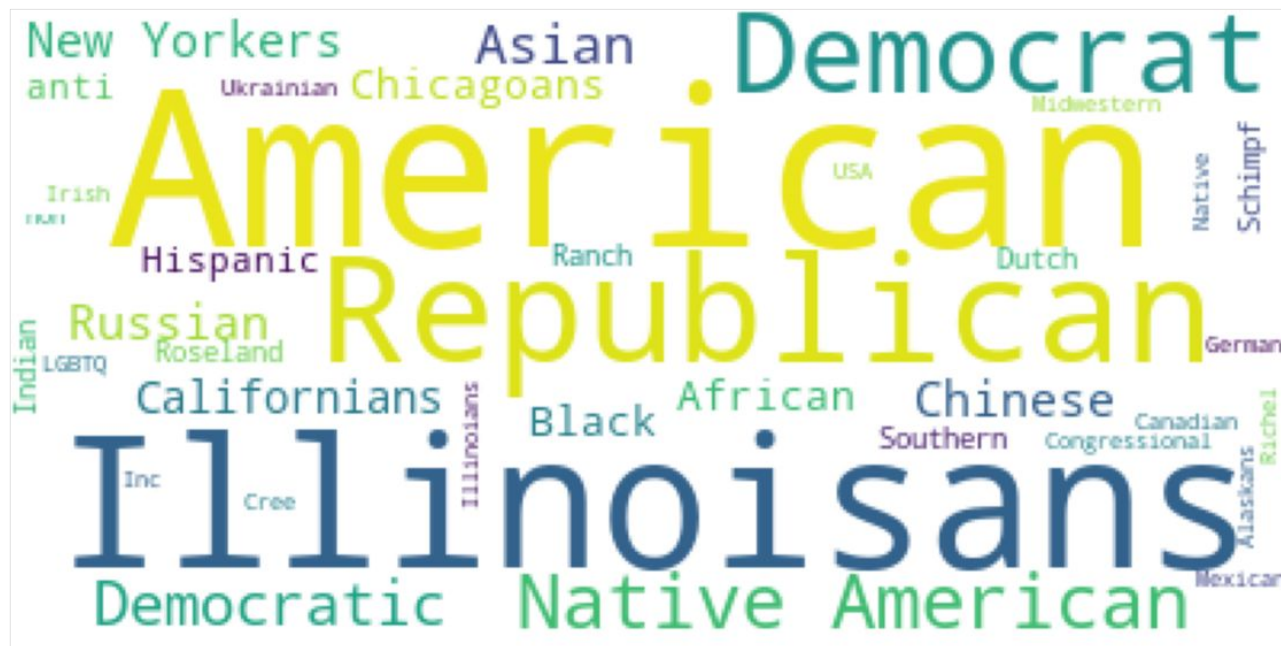
Entity Recognition - Organizations



Entities	Labels	
the U.S. Census Bureau	ORG	25
the Census Bureau	ORG	19
ICU	ORG	17
Congress	ORG	15
Sidecar Health	ORG	14
GOP	ORG	12
Buckley	ORG	11
The Census Bureau	ORG	11
White Bass	ORG	10
PES	ORG	10
the Census Bureau's	ORG	9
U.S. Census Bureau	ORG	9
Caterpillar	ORG	8
the Illinois Policy Institute	ORG	8
the US Census Bureau	ORG	8
House	ORG	8
D-FW	ORG	8
the 2020 Census	ORG	7
IRS	ORG	7
Bettmann //	ORG	7
State	ORG	7
Census Bureau	ORG	7
2020 Census	ORG	7
YouTube	ORG	6
Senate	ORG	6
The U.S. Census Bureau	ORG	6
Loyola University	ORG	5
Divounguy	ORG	5
Post-Enumeration Survey	ORG	5
Medicare	ORG	5

[illegible]

Entity Recognition - NORPs



Entities	Labels	
Illinoisans	NORP	31
Americans	NORP	26
Republican	NORP	20
American	NORP	13
Democrats	NORP	13
Native American	NORP	11
Democratic	NORP	10
Democrat	NORP	9
Republicans	NORP	8
New Yorkers	NORP	6
Native Americans	NORP	6
Chinese	NORP	5
Californians	NORP	5
Asian	NORP	4
Russian	NORP	3
Chicagoans	NORP	3
Asian American	NORP	3
Roseland	NORP	2
Russians	NORP	2
Ranch	NORP	2
Schimpf	NORP	2
Southern	NORP	2
African American	NORP	2
Hispanic	NORP	2
Dutch	NORP	2
Black	NORP	2
Illinoisans	NORP	1
Black Chicagoans	NORP	1
anti-LGBTQ	NORP	1
anti-Chinese	NORP	1