



# Detecting Factors of Illinois Exodus with Natural Language Processing



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THE UNIVERSITY OF  
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# Executive Summary

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The US Census Bureau released figures showing the population of Illinois had declined for years. As one of the few states in the US with negative population growth, Illinois is suffering from wrenching structural problems – economic shifts and the legacy of segregation. Relevant authorities devote to rescue Illinois from the severe fiscal deficit, while their unwise policies infuriate the populace, fuel population loss, and accelerated deterioration in its fiscal situation.

To date, The majority interest groups in Chicago have changed to public employees, real estate interests, bankers, and vendors; however, they're preying on the city. Consequently, rising income tax hollows out Chicago's middle class and increases wealth inequality. With rising taxes and declining population, more and more local business is out-migrating, which decreases job opportunities as a consequence. Given this, the authorities should strategize correspondingly to break the cycle, or imminent demise is waiting ahead.

The project aims to detect the crux concerning the Illinois Exodus by deconstructing news with natural language processing techniques and provide solutions to reverse the trend. Public opinion plays a decisive role in the success of policymaking; therefore, to mitigate the risks, the government should exert more effort to analyze public opinion profoundly.

# Data and Methodology



## Data

- News web scraped from Oct 1st to 31st 2019 mainly about Chicago and Illinois
- Nearly 50k articles, including title, text, crawled date and language



## Data Cleaning

- Clean (noise), normalize and tokenize data – NLTK, regex, and WordNetLemmatizer
- Downsize article base – filter out unrelated articles and news with repeated titles; summarize articles (sumy)



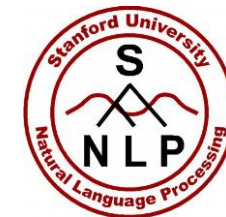
## Topic Modeling, Sentiment Analysis and Tagging

- Tagging (organization, person) – Stanford NER tagging
- Topic modeling – LDA
- Sentiment analysis – Textblob



## Visualization

- Concordance
- Wordcloud, pyLDAvis.genism





# Illinois Exodus - Problems

## NEWS TITLE

## HIGH FREQUENCY WORDS

sale new home chicago area stagnant far year  
 rent fall southern california seattle miami san francisco san jose chicago honolulu others  
 end chicago teacher strike underscore pension crisis wastewatcher  
 kentucky get creative billboard campaign lure away illinois business  
 oped illinois deck state tax hike lost big ballot box  
 illinois deck state tax hike lost big ballot box il policy  
 factcheck pritzkers muddled claim illinois population loss mix metric  
 racist gun inside white supremacist group hiding plain sight people met anna illinois  
 wish racist lore behind city n...  
 chicago losing black middle class get back  
 progressive income tax uncertainty likely put brake illinois weak housing recovery il policy  
 letter mayor lori lightfoot seek bankruptcy authority chicago tribune  
 opinion dick durbin rural health care illinois must improve columnist thesoutherncom  
 state week warrant unredacted pritzkers approval rating people leaving illinois  
 outmigration continue illinois voter see need new leadership rep caulkins say  
 greuling illinois need walk walk economic development plan  
 lawmakersits time get illinois corner longer afford fight state future saukvalleycom

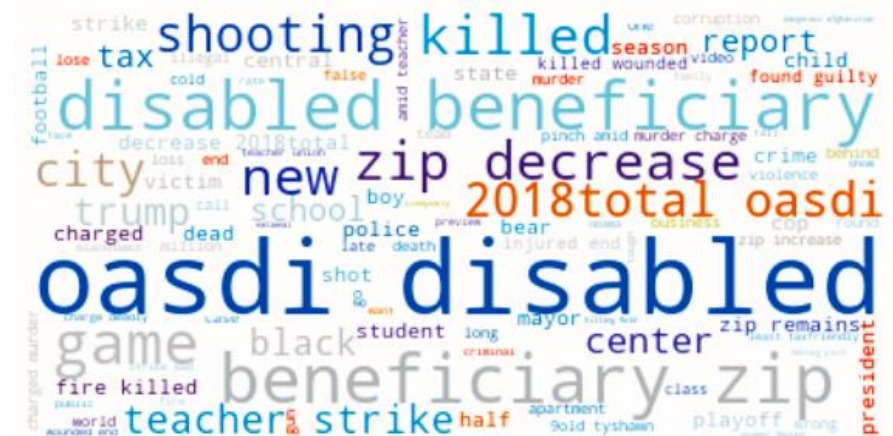
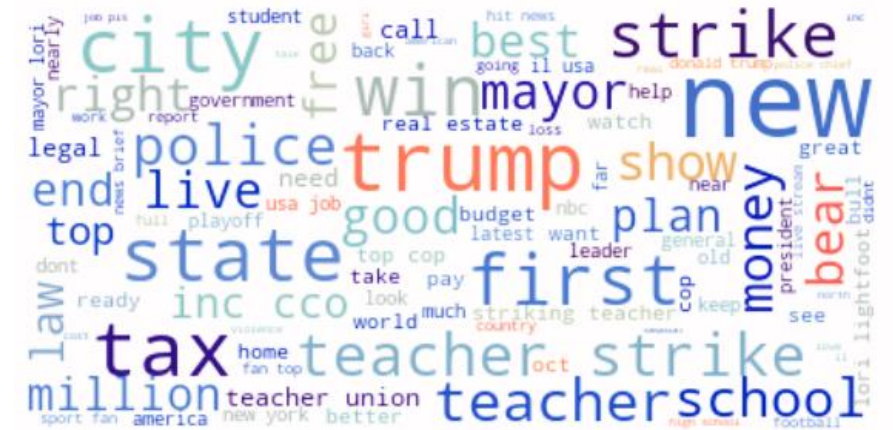
#Census\_Bureau

#declining population

#population loss

#population growth

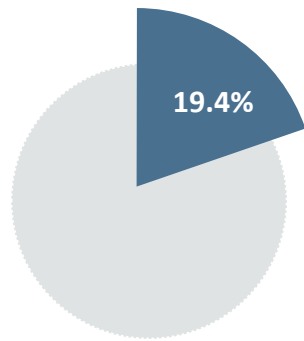
★ The upper part is news titles with contents containing Census Bureau, declining population, population loss, and population growth, and word cloud on the right are high-frequency words extracted from news articles. From this, we can have an overview of the most concerned issues for Illinois residents are violent crime, police, fire, tax, housing price, rent, new leader for Illinois, Chicago Public School (CPS) strike, CTU, somniferum pod, bear, game, middle class, racist, and OASDI disabled beneficiary.



# Illinois Exodus - Problems

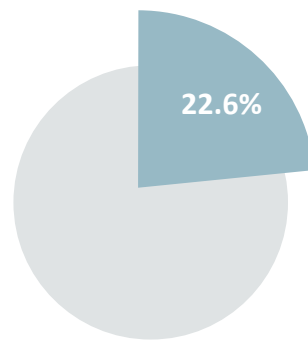
## KEY FACTORS OF MIGRATION

■ Opportunities ■ Problem



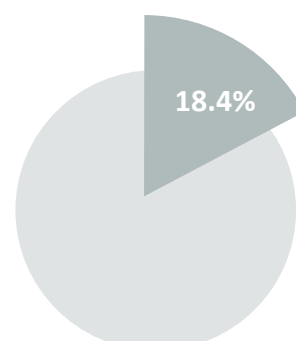
### LIVING EXPENSE

- Housing
- Taxes
- Household expenses



### LIVING CONDITION

- Crime rate
- Climate
- Neighborhood : race, society status



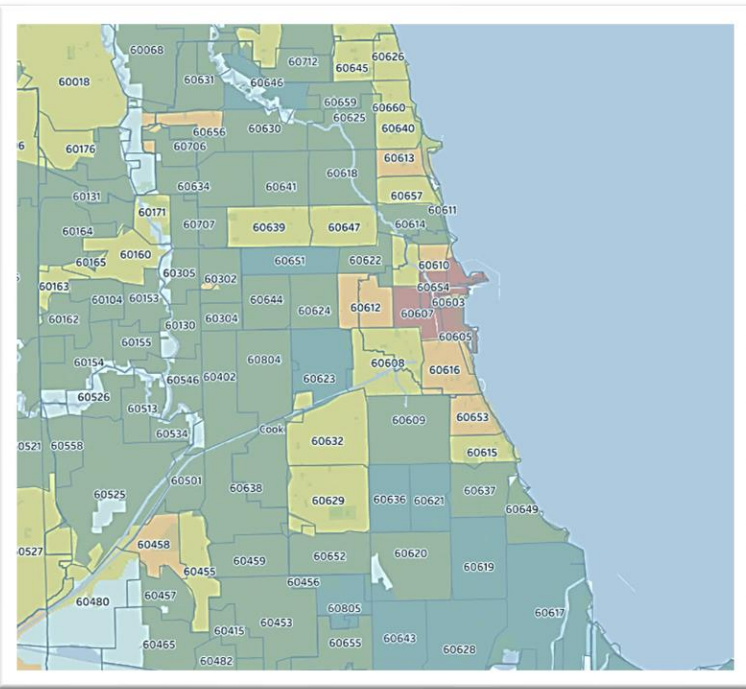
### EMPLOYMENT / EDUCATION

- New job or job transfer
- Commute
- Attend college
- Retired

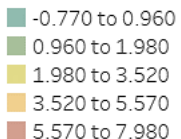
★ Based on the NLP results and migration factors identified by Census, we can conclude that the main reasons for Illinois Exodus are related to high housing prices, high taxes, high household expenses, and a high homicide rate. Chicago has had a notorious reputation of “The Chicago Way,” and President Trump even compared it to Afghanistan. Chicago spends nearly 22% of the total budget on public safety (City of Chicago 2019 Budget Overview) every year, which exceeds the number of pension funds; however, the effect is limited. Moreover, Chicago’s per capita city pension debt has doubled to \$15,380 in 4 years (3 times higher than New York). Accordingly, legislators raise the taxes, even if Illinois has been the least tax-friendly state in the Union. After tax hikes, the exodus from Chicago and Illinois is underway; as population falls, so do property values, which undermines retirement savings for most Illinoisans; and increasing debt on a declining population scares away employers and decreases opportunities.

# Opportunities for Illinois

## 2018 POPULATION GROWTH IN CHICAGO



population  
growth rate

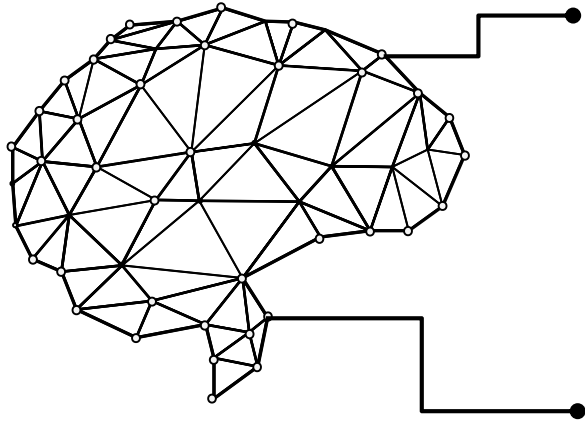


★ The crux of stagnant or declining population growth is not only because of the mismanagement of governors but also because of its social structure – Chicago is undergoing gentrification and black suburbanization. Nearly 40% of Chicagoans have college degrees, which is more than NY and LA. As seen in the graph, in spite of high living expenses in Downtown Chicago, the population grows fast here, while large stretches of the rest of the neighborhoods are shrinking. Worst of all, these neighborhoods have suffered from decreasing middle-class populations, disinvestment, and increased crime. The one that shrank the most are all low-income community areas that are either majority black or majority Latino.

A 2017 report “The Cost of Segregation” found that if the city’s black-white segregation levels were reduced to meet the national level, the city’s economy would generate \$8 billion more annually. The median income for black households is only a half that of white households, and the black-white residence segregation perpetuates an opportunity gap.

Besides, crime is highly correlated to poverty. Instead of increasing the policing budget to lower the murder rate, it is recommended to balance urban and rural development and wealth inequality. While thriving rural education with CPS, the government should encourage manufacturers to locate in rural areas and give tax incentives to train the unskilled for the new jobs. Moreover, Illinois lawmakers legalized sports betting, casino, and marijuana, so that relevant industries can move to Illinois to seize the market. As to residing in Illinois, it is a double-edged sword - there will be more job opportunities in rural areas, while the tax rate and crime rate are also higher.

# Recommendations



1

## Build up fiscal firewalls:

- An elected city controller, a chief financial officer, and an elected city attorney
- Voter approval for tax hikes and new debt
- A City Council that engages with the budget

2

## Reforms to the City Council:

- Reduce the number of aldermen in half
- Strip aldermanic privilege
- Insulate policing from the mayor

3

## Rural Development:

- Tax Incentives for manufacturers located in rural areas
- Develop state-owned enterprise in rural areas
- Education, social workers and nursing