

Data Skills 2 Final Project: Lots of Lots

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1 Summary

Vacant lots are a persistent problem in the city of Chicago. The City holds thousands of pieces of property throughout its jurisdiction, many the result of foreclosures and systemic disinvestment. This represents a huge burden to the city in maintaining these lots and attempting to transfer them to new owners. However, current management and disposition of vacant lots is hindered by information problems, including:

- Lack of transparency for residents regarding decision-making process
- Relevant information about the lots is spread through multiple data sources that do not cross-populate
 - Environmental data is only collected on an "as requested" basis, and stored in PDFs in the Department of Assets, Information, and Services
 - Property valuations and taxes owed do not update once the lot enters City ownership because the County does not assess tax-exempt properties
 - If a Department begins developing plans for using/selling/leasing a lot, there is no method by which they can notify or indicate this to other Departments
- Lack of clear standards for lots to meet before transfer to private ownership

Our project attempts to address some of the information concerns plaguing vacant lot disposition in Chicago, particularly the lack of clear standards for transfer eligibility. Using the existing City-Owned Land Inventory, we created an index by which lots are "scored" on their candidacy for disposition and transformation into green space.

2 Motivation

Early 21st century Chicago experienced stagnating population growth and out-migration. This led to a surplus of city-owned vacant lots. In 2014, the city started a program trying to incentivize business owners and community leaders to purchase these lots and re-purpose them. Despite these efforts, many lots remain on the market. Many residents feel the need for both more community

spaces and less vacant lots in their neighborhoods. For our context, we will focus on re-purposing these empty lots into "green space" akin to a community garden or park - a public good.

To assess whether we can diagnose whether some lots are better than others for re-purposing, we decided to focus on city of Chicago program eligibility, transportation access, and existing environmental status. First, there have been a handful of programs in recent years that have tried to encourage private purchase of existing land inventory, such as Large Lots, Invest Southwest, and ANLAP. These types of lots would make for better candidates. Second, we will look at existing transportation infrastructure in the neighborhood because residents are more likely to use these areas as hubs or visit them from neighboring areas. Finally, we will look at environmental conditions like pollution or if other parks are nearby because we assume that green space re-purposing would be less likely if the area is polluted and less useful if there are already parks.

3 Data

In order to determine which vacant lots would be most suitable for turning into green-space, we looked at the following variables that could influence park quality:

1. Amount of heavily polluted sites nearby
2. Amount of green space nearby (parks)
3. Amount of 'L' train stops nearby
4. Amount of bus stations nearby
 - (a) We used a subsection of bus stations that are considered Equitable Transit Oriented Development (ETOD) corridors
5. Program eligibility
 - (a) Large Lots: lot must be vacant and in a residential zone
 - (b) Adjacent Neighbors Land Acquisition Program (ANLAP): lot must be zoned RM-5, RT-4, or RS-3 and appraised below \$50,000, can only be sold to the property owner next door to the lot
 - (c) Invest South West: while not a vacant lot disposition program, Invest South West communities receive high levels of city investment and technical support. These communities are also some of the most historically disinvested in the city. Therefore, lots in these communities could be put into productive use quickly and efficiently.
 - (d) Equitable Transit Oriented Development (ETOD): this city-wide planning initiative provides additional resources to projects located within half a mile of an "L" or eligible bus stop

All of this data is publicly available on the city of Chicago website, with the exception of the brownfields data which is located on the EPA website. In order to put the park in a safe area, we created a buffer to calculate how far away

a polluted site was from a potential location. Lots with fewer pollution sites nearby are less likely to be turned into a park. The amount of greenspace nearby is important as well, since we want to prioritize placing parks in communities currently lacking them. Therefore having few parks nearby a lot would make that lot more likely to be turned into a new park. We also wanted to prioritize access to parks, so being in close proximity to high amounts of bus and 'L' stops would make this a desirable location to have a lot turned into a park.

4 Model

Our simple model for this project is exploring the relationship between the presence of pollution areas, or brownfields, and the existence of lots. To do this, we spatially merged our lots and brownfields datasets to a neighborhood shapefile to get the number of lots and brownfields in a given neighborhood. Using total number of lots as our outcome variable and total number of brownfields as our explanatory variable, we find a statistically significant effect in an ordinary least squares regression below, where neighborhood is indexed by i .

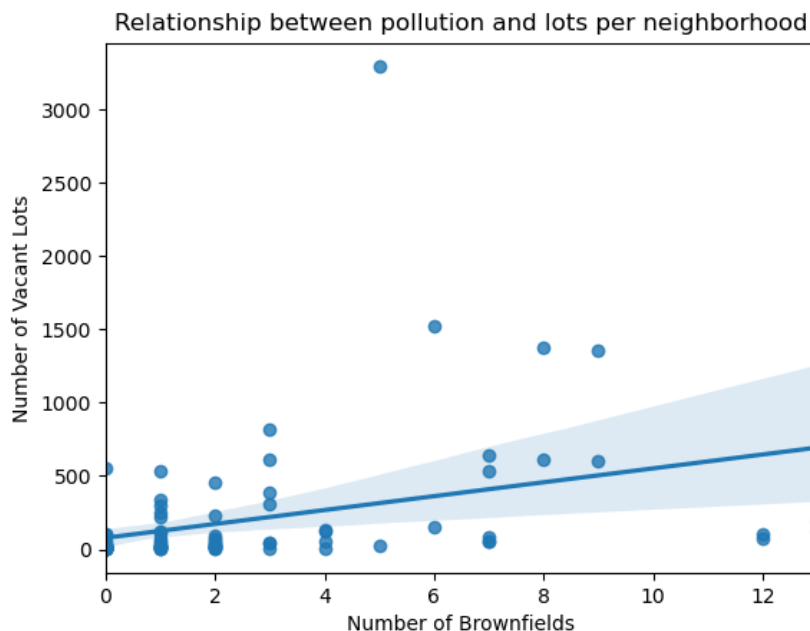
$$Y_i = \alpha + \beta X_i + \varepsilon_i$$

4.1 Results

An additional brownfield is statistically associated with 47 additional vacant lots in a neighborhood at the 99% level.

```
>>> print(results.summary())
OLS Regression Results
=====
Dep. Variable:      lots_count      R-squared:                0.117
Model:              OLS             Adj. R-squared:           0.106
Method:             Least Squares    F-statistic:             11.48
Date:               Tue, 07 Dec 2021  Prob (F-statistic):       0.00106
Time:               19:49:29         Log-Likelihood:          -663.19
No. Observations:   89              AIC:                     1330.
Df Residuals:       87              BIC:                     1335.
Df Model:           1
Covariance Type:    nonrobust
=====
               coef      std err          t      P>|t|      [0.025      0.975]
-----
Intercept      77.9270      57.162       1.363     0.176     -35.688     191.542
bf_count       47.3590      13.975       3.389     0.001      19.582      75.136
=====
Omnibus:         120.483    Durbin-Watson:           1.968
Prob(Omnibus):   0.000     Jarque-Bera (JB):        3126.378
Skew:            4.487     Prob(JB):                 0.00
Kurtosis:        30.614     Cond. No.                  5.36
=====

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
>>> 
```



5 Limitations

Several limitations for our analysis are due to availability of information. Our variable for ANLAP eligibility is merely a proxy, as there is no recent valuation of vacant lots available. Furthermore, the use of brownfields as an environmental metric is severely limited. Best practice for assessing a lot's candidacy for disposition is to conduct an environmental assessment directly on that lot. The City has allocated funding from the American Rescue Plan to conduct these assessments, so ideally our use of the brownfields variable will eventually be replaced by a site-specific environmental quality variable.

Additionally, our index yielded some strange results. Lots in the relatively wealthier and more asset-rich North and East sides of the city had higher average scores than those in the South and West Sides. However, put into historical context, these results are actually far from strange. The South and West sides have suffered from decades of disinvestment and racist policies that play directly into the indicators we chose for our index. These neighborhoods are more likely to be "transit deserts," and they are more likely to be home to polluting industries. Further analysis should consider racial equity implications in the creation of indices and the determination of vacant lot disposition candidacy.

6 References

1. “Adjacent Neighbors Land Acquisition Program (ANLAP).” City of Chicago. [Accessed December 7, 2021.](#)
2. “Equitable Transit-Oriented Development (ETOD) Policy Plan.” City of Chicago. [Accessed December 7, 2021.](#)
3. “Equitable Transit-Oriented Development (ETOD) Policy Plan.” City of Chicago. [Accessed December 7, 2021.](#)
4. Hirschy, Isabelle. Current Status of Vacant Lot Disposition in Chicago, with Vacant Lots Task Force Leader Margaret Decker. Personal, November 8, 2021
5. “Office of the City Clerk - Record : O2014-9405 ‘Large Lots Program.’” City of Chicago, Office of the City Clerk. [Accessed December 7, 2021.](#)