

LIHTC in 3 Communities

June 9, 2022

In this notebook, I demonstrate distribution of Low-Income Housing Tax Credit properties (LIHTC), the main form of creating new affordable housing in Chicago, in different community areas. The LIHTC properties have a 30-year guaranteed affordability period, after which the owners are free to convert them back to market-rent properties. By looking at the year LIHTC credits were allocated and the size of each building, we can determine which properties may be converted back to market-rent buildings, potentially putting residents at the risk of displacement, and how many residents are impacted.

```
[2]: import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np
%matplotlib inline
```

```
[3]: m = pd.read_csv('/Users/bling/Documents/21-22/Housing policy/lihtcpub/LIHTCPUB.
↪CSV')
```

```
/Users/bling/opt/anaconda3/envs/geo_env/lib/python3.9/site-
packages/IPython/core/interactiveshell.py:3444: DtypeWarning: Columns (72) have
mixed types.Specify dtype option on import or set low_memory=False.
exec(code_obj, self.user_global_ns, self.user_ns)
```

```
[8]: # Filter out the LIHTC data for Chicago
lihtc = m.loc[m['fips2010'].str.startswith('17031')]
lihtc.head()
```

```
[8]:
```

	hud_id	project	proj_add	\
12034	ILA00000013	MILWAUKEE AVENUE APTS	3064 N MILWAUKEE AVE	
12038	ILA00000053	ENGLEWOOD APTS	901 W 63RD ST	
12039	ILA00000057	HOLLYWOOD HOUSE	5700 N SHERIDAN RD	
12040	ILA00000059	SENIOR SUITES OF NORWOOD PARK	5700 N HARLEM AVE	
12042	ILA00000064	LORINGTON APTS PRESERVATION	3126 W PALMER BLVD	

	proj_cty	proj_st	proj_zip	state_id	latitude	longitude	place1990	\
12034	CHICAGO	IL	60618	1106313	41.936741	-87.720314	1051.0	
12038	CHICAGO	IL	60621	285609	41.779579	-87.647202	1051.0	
12039	CHICAGO	IL	60660	290808	41.985718	-87.655464	1051.0	
12040	CHICAGO	IL	60631	1067612	41.985134	-87.807144	1051.0	

12042	CHICAGO	IL	60647	243806	41.921638	-87.706680	1051.0
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	n_unitsr	li_unitr	metro	dda	qct	nonprog	nlm_reason	nlm_spc	\
12034	32.0	32.0	2.0	NaN	NaN	NaN	NaN	NaN	
12038	99.0	99.0	2.0	NaN	NaN	1.0	NaN	NaN	
12039	197.0	177.0	2.0	NaN	NaN	1.0	NaN	NaN	
12040	84.0	80.0	2.0	NaN	NaN	NaN	NaN	NaN	
12042	54.0	54.0	2.0	NaN	NaN	1.0	NaN	NaN	

	datanote	record_stat
12034	NaN	X
12038	NaN	X
12039	NaN	X
12040	NaN	X
12042	NaN	X

[5 rows x 75 columns]

```
[9]: lihtc.
      ↳ drop(columns=['hud_id', 'hud_id', 'proj_cty', 'proj_zip', 'proj_st', 'state_id', 'place2010',
                    'place1990', 'place2000', 'fips1990', 'fips2000', 'st2010',
                    'cnty2010', 'scattered_site_cd',
                    'resyndication_cd', 'n_0br', 'n_1br', 'n_2br', 'n_3br', 'n_4br',
                    'basis', 'bond', 'mff_ra', 'fmha_514', 'fmha_515', 'fmha_538',
                    'home',
                    'home_amt', 'tcap', 'tcap_amt', 'cdbg', 'cdbg_amt', 'htf', 'htf_amt',
                    'fha', 'hopevi', 'hpvi_amt', 'tcep', 'tcep_amt', 'rad', 'qozf',
                    'qozf_amt', 'rentassist', 'type', 'credit', 'n_unitsr', 'li_unitr',
                    'metro', 'nonprog', 'nlm_reason',
                    'nlm_spc', 'datanote', 'record_stat'], inplace = True)
lihtc = lihtc.assign(Tract=[int(x) for x in lihtc.fips2010]).fillna(0)
lihtc.drop(columns=['fips2010'], inplace=True)
```

/Users/bling/opt/anaconda3/envs/geo_env/lib/python3.9/site-packages/pandas/core/frame.py:4906: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
return super().drop()

```
[10]: # import conversion map - converts tracts to communities
conv = pd.read_excel('/Users/bling/Documents/21-22/Housing policy/
↳ Census_Tracts_in_Chicago_Community_Areas.xlsx',
↳ sheet_name='TractsCommunityAreas')
lihtc_chi = conv.merge(lihtc, how = 'inner', on='Tract')
```

```
[11]: lihtc_chi.head()
```

```
[11]:      Tract      Label  CommunityAreaNumber \
0  17031010100  Census Tract 101, Cook County, Illinois      1
1  17031010100  Census Tract 101, Cook County, Illinois      1
2  17031010100  Census Tract 101, Cook County, Illinois      1
3  17031010100  Census Tract 101, Cook County, Illinois      1
4  17031010100  Census Tract 101, Cook County, Illinois      1
```

```
      CommunityAreaName      project      proj_add  latitude \
0      Rogers Park      UJAAMA  7655 N BOSWORTH AVE  42.020336
1      Rogers Park      BROADMOOR APTS  7600 N BOSWORTH AVE  42.019409
2      Rogers Park  NORTHPOINT PRESERVATION  7719 N PAULINA ST  42.021507
3      Rogers Park      SU CASA  1614 W JONQUIL TER  42.021313
4      Rogers Park      ENTRE NOUS  1700 W JUNEWAY TER  42.022697
```

```
      longitude  allocamt  n_units  ...  non_prof  trgt_pop  trgt_fam  trgt_eld \
0 -87.669296    34010.0    19.0  ...    0.0    0.0    0.0    0.0
1 -87.669739    446707.0   134.0  ...    0.0    0.0    0.0    0.0
2 -87.672874   1055369.0   304.0  ...    0.0    0.0    0.0    0.0
3 -87.671234      0.0    25.0  ...    0.0    0.0    0.0    0.0
4 -87.673096      0.0    32.0  ...    0.0    0.0    0.0    0.0
```

```
      trgt_dis  trgt_hml  trgt_other  trgt_spc  dda  qct
0      0.0      0.0      0.0      0  0.0  2.0
1      0.0      0.0      0.0      0  0.0  2.0
2      0.0      0.0      0.0      0  0.0  1.0
3      0.0      0.0      0.0      0  0.0  2.0
4      0.0      0.0      0.0      0  0.0  2.0
```

[5 rows x 26 columns]

```
[17]: areas_lihtc = lihtc_chi.loc[(lihtc_chi['CommunityAreaName']=='South Shore')
                                |(lihtc_chi['CommunityAreaName']=='Washington Park')
                                |(lihtc_chi['CommunityAreaName']=='Woodlawn')]
areas_lihtc.replace(9999,1995, inplace = True)
```

/Users/bling/opt/anaconda3/envs/geo_env/lib/python3.9/site-packages/pandas/core/frame.py:5238: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
return super().replace()

```
[15]: import geopandas
```

```

chict = geopandas.read_file("/Users/bling/Documents/21-22/Housing policy/
↳Geographic data/Boundaries - Census Tracts - 2010/
↳geo_export_3bf462eb-b985-42d0-988a-8948fdf2cc25.shp")
areas = chict.loc[(chict['geoid10']=='17031430101') | (chict['geoid10']
↳=='17031430102') | (chict['geoid10']=='17031430200') |
↳
↳(chict['geoid10']=='17031430300') | (chict['geoid10']=='17031430400') | (chict['geoid10']
↳=='17031430500') |
↳
↳(chict['geoid10']=='17031430600') | (chict['geoid10']=='17031430700') | (chict['geoid10']=='170
↳
↳(chict['geoid10']=='17031430900') | (chict['geoid10']=='17031431200') | (chict['geoid10']=='170
↳
↳(chict['geoid10']=='17031431302') | (chict['geoid10']=='17031431400') | (chict['geoid10']=='170
↳
↳(chict['geoid10']=='17031836100') | (chict['geoid10']=='17031400300') | (chict['geoid10']=='170
↳
↳(chict['geoid10']=='17031834500') | (chict['geoid10']=='17031400800') | (chict['geoid10']=='170
↳
↳(chict['geoid10']=='17031420200') | (chict['geoid10']=='17031834400') | (chict['geoid10']=='170
↳
↳(chict['geoid10']=='17031420800') | (chict['geoid10']=='17031420700') | (chict['geoid10']=='170
↳(chict['geoid10']=='17031420600'))]

```

```

[16]: areas['geoid10'] = pd.to_numeric(ss.geoid10)
areas.rename({'geoid10':'Tract'}, axis = 'columns', inplace = True)

```

/Users/bling/opt/anaconda3/envs/geo_env/lib/python3.9/site-packages/geopandas/geodataframe.py:1351: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
super().__setitem__(key, value)
/Users/bling/opt/anaconda3/envs/geo_env/lib/python3.9/site-packages/pandas/core/frame.py:5039: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
return super().rename()

```

[18]: # Convert the latitude and longitude information to geopandas objects
areas_map = geopandas.GeoDataFrame(areas_lihtc, geometry = geopandas.
↳points_from_xy(areas_lihtc.longitude, areas_lihtc.latitude))

```

```
[20]: com_map= geopandas.read_file('/Users/bling/Documents/21-22/Housing policy/
↳Geographic data/Boundaries - Community Areas (current)/
↳geo_export_8de711f3-84a7-4e58-9b48-fa4037567404.shp')
areas_map2 = com_map.loc[(com_map['community'] == 'SOUTH_
↳SHORE')|(com_map['community']=='WASHINGTON PARK')
|(com_map['community']=='WOODLAWN')]]

[50]: sns.set_context('paper')
ax = areas.plot(color = 'white', edgecolor= 'black', figsize =(12,10))
x = areas_map.plot('yr_alloc', ax = ax, cmap = 'cool', markersize = 'li_units',
↳legend=True,
legend_kwds = {'orientation':'horizontal','label':'Year_
↳Allocated'})
ax.set_yticks([])
ax.set_xticks([])
plt.title('Distribution of LIHTC in South Shore, Washington Park, Woodlawn',
↳fontsize=14)
z = areas_map2.plot(ax = ax, facecolor="none", edgecolor="black", linewidth =
↳2, legend = True)

l1 = plt.scatter([],[], s =50, color = 'grey')
l2 = plt.scatter([],[], s = 100, color = 'grey')
l3 = plt.scatter([],[], s = 200, color = 'grey')
l4 = plt.scatter([],[], s = 400, color = 'grey')
labels = ['50','100','200','400']
leg=plt.legend ([l1,l2,l3,l4], labels, ncol=1, fontsize = 12, loc= 1, title =
↳'Number of Affordable Units')
ax.add_artist(leg)
fig = plt.gcf()
```

Distribution of LIHTC in South Shore, Washington Park, Woodlawn

