Final Report

An Analysis of Covid-Era Evictions for the Commonwealth of Massachusetts Joint Committee of the House of Representatives on Housing

by BU Fall 2021 Spark Analysis, Teams 1 & 3

Proposed by

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Table of Contents

Introduction & Background

Background

Policymakers in Massachusetts and across the country are working to understand and reduce the prevalence of residential evictions. The COVID-19 pandemic could potentially cause an adverse impact on the livelihood of tenants. As policymakers, advocates, and practitioners work to advance eviction prevention measures and improve housing stability for renters, it is critical to examine the scale of the issue to inform the most appropriate and targeted interventions.

Goal & Key Questions

The overarching goal of this project is to better understand state eviction patterns over the past two years (2020 - 2021) in Massachusetts, identifying any geographic differences, shifts in eviction filing types, and any inflection points in filings of interest to policymakers. Especially for understanding how different parts of the state differ in their experiences with housing, housing policy, and evictions. Then inform policymakers who need more help in terms of the housing experience, and help them on how to help people facing housing instability: demographics including demographics profile in Massachusetts; comparison between other states; and distribution of rental assistance. Specific questions are listed below:

- What is the profile (race, ethnicity, family composition) of those evicted, what is the profile of those evicting (small landlord, large landlord, etc.), how does this vary by town/city – where are the highest rates, what are the causes of eviction, what is the eviction experience? i.e. who has received notice to quit, etc. How has this been impacted by different moratorium milestones (e.g. CDC expiration, state expiration, city expiration)
- How does Mass data compare to other states e.g. per capita evictions? Big cities in Mass compared to big cities elsewhere?
- How has rental assistance distribution affected this situation? Which cities/ towns or census blocks are receiving rental assistance and who isn't – based on race/ethnicity/etc. Have specific landlords received rental assistance before filings but still carrying out evictions, etc. Who is being denied rental assistance and why?

We firstly plotted out statewide eviction patterns and the reasons for being evicted then focused on the first question under a demographic profile with race and ethnicity, analyzing the profile of the evicted generalized by census tract data in each municipality in Massachusetts and figuring out the difference between municipalities, features in municipalities that have high eviction rates and low eviction rates.

We also worked on geographic patterns on Gateway Cities. Discovered different eviction patterns in gateway cities from statewide average, and demographic profile in gateway cities in detail.

In addition, some economical factors including poverty and employment are also covered in our analysis written in the Appendix for reference.

However, some other attributes are not mentioned. Analysis on house attributes(price, size, position, etc.); Evicting & Landlords information; Eviction cases compared to other states; and Eviction experiences under different policies need to be implemented. Besides, distribution of rental assistance is also a majority part of understanding eviction patterns. The things above should be done in further work and would help significantly.

Executive Summary

Upon analyzing our dataset, we found that

1. South and north of Massachusetts have higher eviction rates.
2. While most eviction filings are initiated due to non-payment of rent, I observed a slight increase in no-fault eviction filings in the past few months of 2021.
3. Gateway cities had high evictions per household rate within their corresponding brackets.
4. Some municipalities with high eviction rates, such as Randolph and gateway cities, seem to have a decrease of eviction fillings over time, even lower than their 2019 fillings. Great to analyze why and understand which policies worked. The rising costs in such cities could still put them at risk.
5. People of color could be impacted as we observed municipalities with large populations of people of color communities also have high eviction rates. The degree to which they could be impacted negatively requires further analysis.

Methodology

Dataset

1. Datasets/Eviction Filings thru July2021: Housing Docket Dataset 1: Dataset provided to our team with court docket data merged with the MAPC parcel database.
2. Group 1/eviction data: Housing Docket Dataset 2: Evictions case docket data provided directly from MassLandlords.
3. Massachusetts Poverty rate data[1]
4. Massachusetts Employment data[2]
5. Group 1/municipality profile: Municipalities in Massachusetts Census tract data (in folder Muni_Profile ACS 5-Year Estimates Subject Tables(population, income, occupation, education, households).[3]

Since we don't have a specific profile of the individuals evicted, we decided to split the eviction cases into municipalities and use the Massachusetts profile data in each municipality to generalize the profile of the people being evicted including population, income, education, occupation, and household number.

We also used Massachusetts Census tract data to count the population of each municipality and split municipalities into several brackets under total population in order to compare the eviction rate with the same size of municipalities.

Data Preparation and Processing:

1. Count the number of evictions in each municipality.
2. Aggregate municipalities in Massachusetts profile data.
3. Normalize by dividing evictions by the total number of rental households in each municipality, and sort the eviction rate.
4. Aggregate total population of each municipality and split municipalities into brackets.
5. Analyze profiles of each municipality with eviction rate and examine via visualizations.

Reason for using evictions per rented households:

In order to understand the magnitude of the eviction situation in different municipalities, the number of eviction cases was found to be insufficient. The number of evictions per number of rented households shows the percentage of households where tenants are about to be evicted/served an eviction notice. This paints a general picture of the scenario in a given municipality.

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[1] https://data.census.gov/cedsci/table?q=poverty%20rate&t=Income%20and%20Poverty&g=0400000US25%24160000&tid=ACSST1Y2019.S1701

[2] https://dlsgateway.dor.state.ma.us/reports/rdPage.aspx?rdReport=dashboard.category_5

[3] https://data.census.gov/cedsci

Reason for splitting cities into brackets:

The analysis of eviction trends across various regions had to be uniform. When initially comparing the number of evictions per population of a city, we found some abnormalities. Rowe had the highest rate. However, upon further investigation, we found that there was just one eviction and the population of Rowe was over 400. This was misleading and therefore, we wanted to compare municipalities with similar populations and thus split them by population brackets. This also makes statewide analysis flexible because it can be performed either at the inter or intra bracket level. Brackets were chosen so that there were an equal number of municipalities in each bracket(the very high population bracket has fewer cities due to the sheer population of these cities; Boston is not present in any bracket).

Municipalities are split as follows:

Population bracket 1: population > 1000 & <= 10,000
Population bracket 2: population > 10,000 & <= 50,000
Population bracket 3: population > 50,000 & <= 90,000
Population bracket 4: population > 90,000 & <= 200,000

Findings & Analysis

Overarching Question: What is the profile (race, ethnicity, family composition) of those evicted, how does this vary by town/city – where are the highest rates, what are the causes of eviction? How has this been impacted by different moratorium milestones (e.g. CDC expiration, state expiration, city expiration)

Statewide Eviction Patterns

Eviction Patterns by Fillings Count

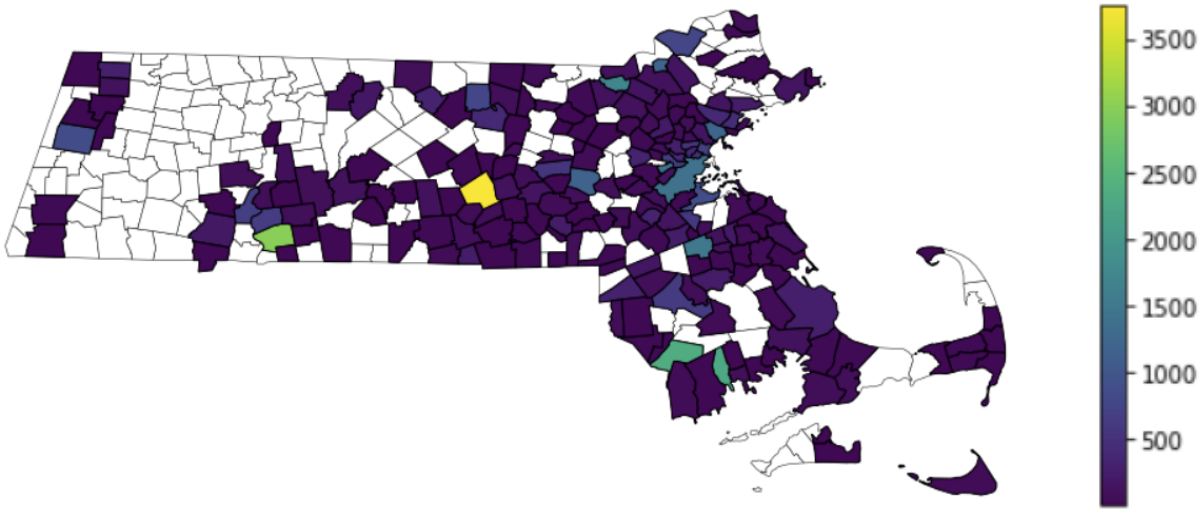


Figure 1. Eviction Filings of cities with more than 10 evictions.

With the visualization of cities with more than 10 evictions on a map of Massachusetts, we can see that the majority of the middle-west part and northeast part has fewer eviction cases since these cities are small municipalities and only some of the most western part of the state have many eviction cases.

Eviction cases concentrated among the east part of Massachusetts, especially around Boston and southwest Massachusetts. Since these parts have many large municipalities, there are a lot of rentals with a huge amount of population and migration.

The number of eviction fillings may not fully represent the degree of home instability in the state of Massachusetts as an unknown number leave the property to avoid eviction. Tenants can be evicted or displaced through informal means without ever interacting with the court system. Renters can receive a notice to quit their landlord and leave their homes thinking they have been evicted when only a judge actually can evict them. Some could leave voluntarily to avoid the trauma of defending their tenancy in court or being forcibly removed from their home by police.

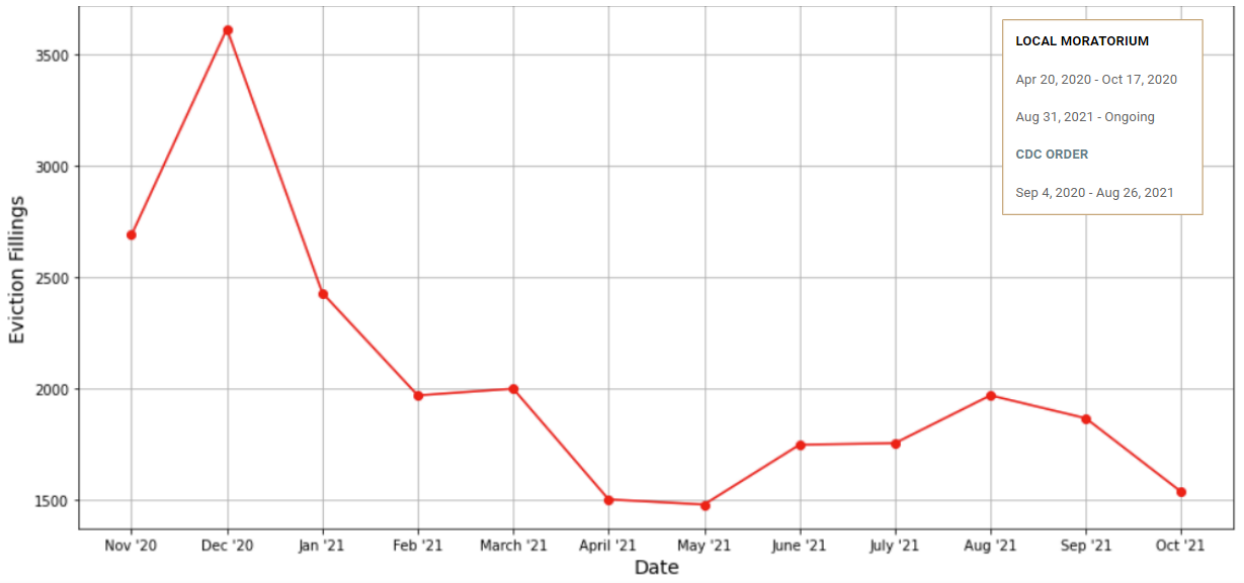
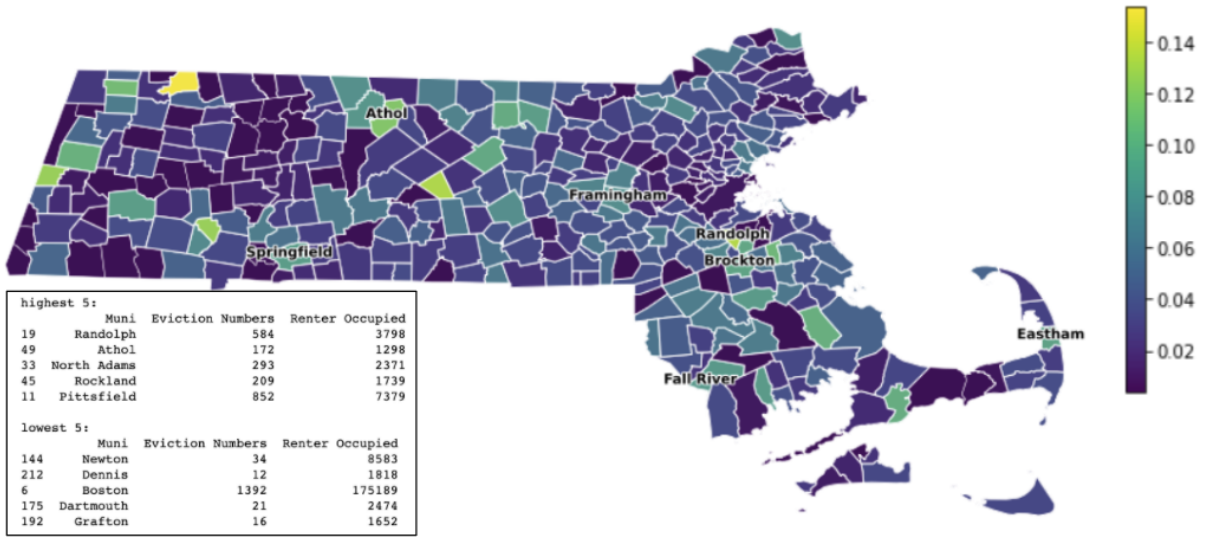


Figure 2. Massachusetts: Eviction Filings by Month.

The state moratorium on evictions expired on Oct. 17, 2020, and the federal moratorium was struck down in late Aug. 2021.

Since the end of the federal moratorium in Aug. 2021, the courts have received roughly 1500 to 2000 monthly evictions, far below last year's rates after the state moratorium ended. However, these are filings, not executed eviction judgments, and several court interventions introduced by the state's Eviction Diversion Initiative aim to connect at-risk tenants with resources and support that will settle the case and avoid a judgment altogether.

Eviction Patterns by Fillings Rate per Rented Household



highest 5:

	Muni	Eviction Numbers	Renter Occupied
19	Randolph	584	3798
49	Athol	172	1298
33	North Adams	293	2371
45	Rockland	209	1739
11	Pittsfield	852	7379

lowest 5:

	Muni	Eviction Numbers	Renter Occupied
144	Newton	34	8583
212	Dennis	12	1818
6	Boston	1392	175189
175	Dartmouth	21	2474
192	Grafton	16	1652

Figure 3 from geopandas_visualizations.ipynb. Eviction Rate per Rented Household Map.[4] Annotations represent the municipality with the highest eviction rate per rented household for each population bracket. **Note:** top two highest eviction rate per rented household for each population bracket is the annotated text in map.

Central and Southeastern Massachusetts have experienced disproportionately higher rates of eviction filings. We can see that the majority of the middle-west part and northeast part have lowest eviction rates.

Reasons for Eviction

Initiation type: 2020

Efiled SP Summons and Complaint - Non-payment of Rent	7455
SP Summons and Complaint - Non-payment of Rent	2445
Summary Process - Residential-Cause other than Non payment of rent.	1499
Efiled SP Summons and Complaint - Cause	1060
Summary Process - Residential (c239)	873
Efiled SP Summons and Complaint - No Cause	497
SP Summons and Complaint - No Cause	383
Efiled SP Summons and Complaint - Foreclosure	234
SP Summons and Complaint - Cause	232
SP Transfer - Non-payment of Rent	155
SP Transfer - Cause	50
SP Transfer- No Cause	48
SP Summons and Complaint - Foreclosure	38
SP Transfer - Foreclosure	8
Public Housing Tenant Illegal Activity Declaratory Judgment (c139 §19)	7
Money Action - District Court Filing (c231 §§ 103-104)	3
Case transferred from another court or has prior manual docket - no fee due	3
Replevin (c247)	1
Summary Process Residential Non-payment of Rent	1

Initiation type: 2021

Efiled SP Summons and Complaint - Non-payment of Rent	8582
Efiled SP Summons and Complaint - Cause	2308
Efiled SP Summons and Complaint - No Cause	1968
Summary Process Residential Non-payment of Rent	1192
SP Summons and Complaint - Non-payment of Rent	1132
SP Summons and Complaint - No Cause	951
Summary Process - Residential-Cause other than Non payment of rent.	605
Summary Process - Residential (c239)	539
SP Transfer - Non-payment of Rent	260
SP Summons and Complaint - Cause	254
SP Transfer- No Cause	164
SP Transfer - Cause	136
Efiled SP Summons and Complaint - Foreclosure	120
Public Housing Tenant Illegal Activity Declaratory Judgment (c139 §19)	6
SP Transfer - Foreclosure	4
Case transferred from another court or has prior manual docket - no fee due	3
SP Summons and Complaint - Foreclosure	2
Money Action - District Court Filing (c231 §§ 103-104)	2

Figure 4. Eviction FillingsInitiation types in 2020(Jan-March, Nov.-Dec) and 2021.[5]

[4]***Note:*** *The numbers of eviction filings are not exact and therefore do not represent eviction filings by municipality in their totality. Some trial court records are missing. Furthermore, data can be subjected to miscalculations.*

[5]***Note:*** *There is a limitation on our analysis as we have not filtered the eviction filling not related to none payment of rent to understand which cities might need more financial support. As shown, there are thousands of eviction filings related*

Initiation type is the type of eviction a landlord has filed on a tenant. These data do not represent executed evictions, but rather landlords filing for eviction. As shown in figure 4, most initiation types are due to non-payment of rent. Compared to initiation type in 2020, the cases under Efiled SP Summons and Complaint with Cause and No cause increased. **No cause eviction initiation type can only happen when a tenant does not have a lease and is a tenant at will. Then, a landlord does not have to state a reason for evicting a tenant.**[6]

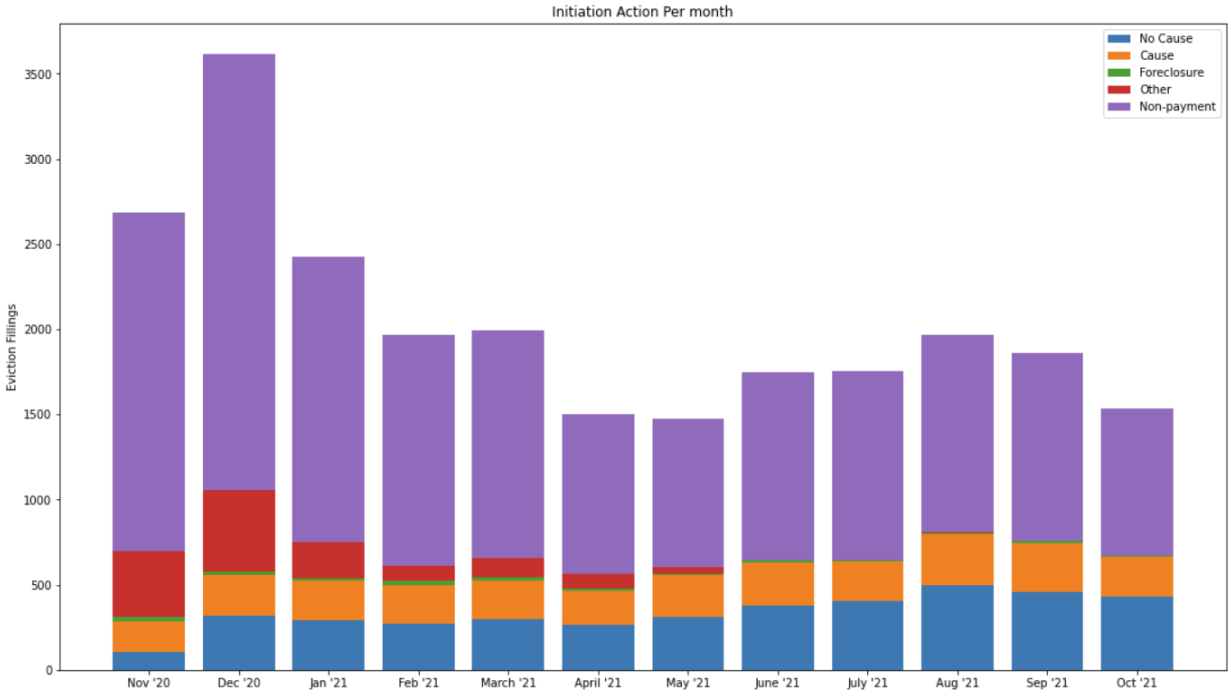


Figure 5 from Timeseries_Eviction_Analysis.ipynb. Initiation action type per month.

We looked at the rate of new eviction initiations against policy changes of relevance to public officials -- as well as tenants. We noted earlier the important events which are the periods for state and federal moratoriums and highlighted a peak of eviction fillings after the end of state moratorium, Oct. 2020. This graph shows there was an increase in other causes of eviction in December 2020.

In May 2021, there was a slight increase in no-cause evictions and a decrease in non-payment evictions, as observed in our data. Furthermore, the graph in figure 5 shows a reduction in other causes of evictions.

Demographic Patterns

Race & Ethnicity

Documenting populations disproportionately at risk of eviction informs researchers, advocates, and policymakers striving to better understand and address long-standing disparities in access to stable housing. The lack of data on defendant race and ethnicity limits our ability to

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to no cause, meaning the renter might have willingly left. This will especially distort the eviction filings rate for small municipalities.

[6] https://www.masslegalhelp.org/when-can-a-landlord-evict

address some of the most pressing questions in the field. Are Black and Latinx renters evicted at higher rates than their white counterparts? Answering these questions is central to addressing the long history of excluding communities of color from housing and other opportunities in the U.S.

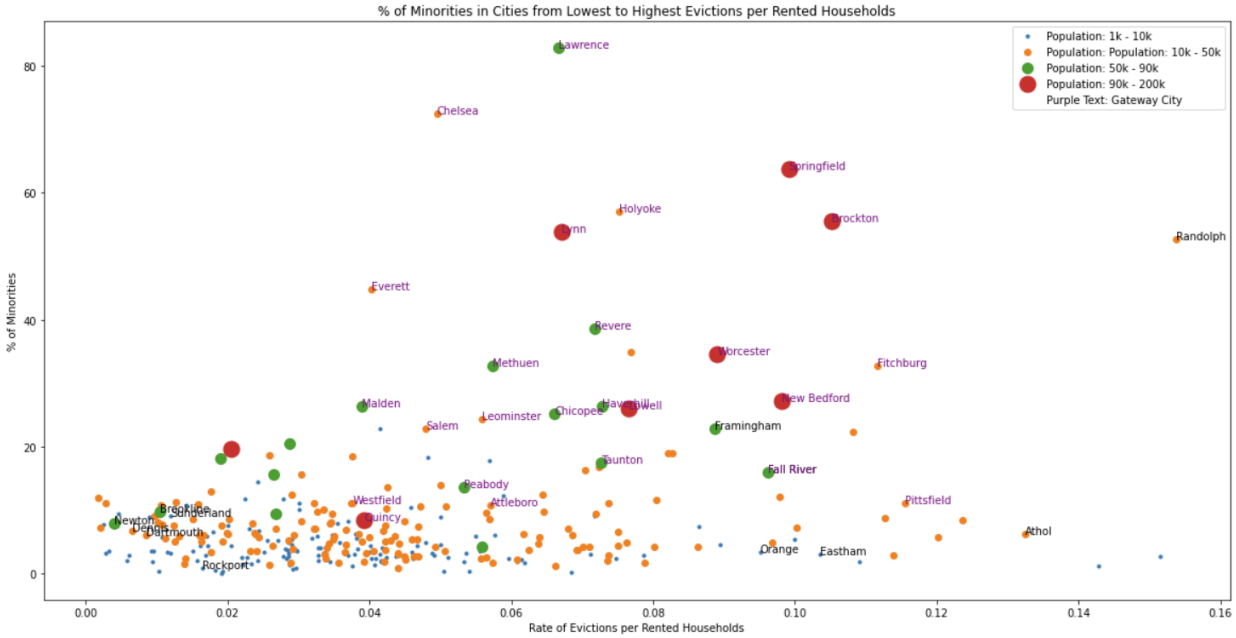

Figure 6 from _race_profile_population_bracket.ipynb. Percentage of minority groups in each municipality.

The graph above maps each municipality with the percentage of the minority population and compares it to the eviction filings rate per rented household. The graph color codes municipalities into four groups by populations (see key in the upper right). This is to avoid comparing smaller municipalities with larger ones. This graph illustrates several observations we make about population data and evictions:

1. Municipalities in population brackets 1 and 2 (orange and blue circles), or rural areas, have a very low percentage of people of color, except Randolph and a group of cities called the Gateway Cities (discussed in next section).
2. Most larger municipalities (annotated as red and green circles) have more people of color communities. Larger cities can be analyzed to see a discrepancy between race and eviction filings in future work. The analysis can be done using census data to see the poverty rate per race or analysis per neighborhood.
3. Another observation is about the group (annotated in purple) called gateway cities. Gateway cities have the highest number of people of color as they all sit at the top of the plot. Given that a few sources say gateway cities have a history of eviction filings and low income, we can infer there could be a relationship. Regardless, such comments would need further analysis.

A solution that was tried is to analyze pulse data to see which race groups are more behind on rent or fear of being evicted. Upon early preliminary analysis, I found that black/AA

are more likely to be behind on rent in the state of Massachusetts, both in phases 2 and 3[7]. Therefore, it is crucial to show the graph above to understand the general demographics of the state of Massachusetts.

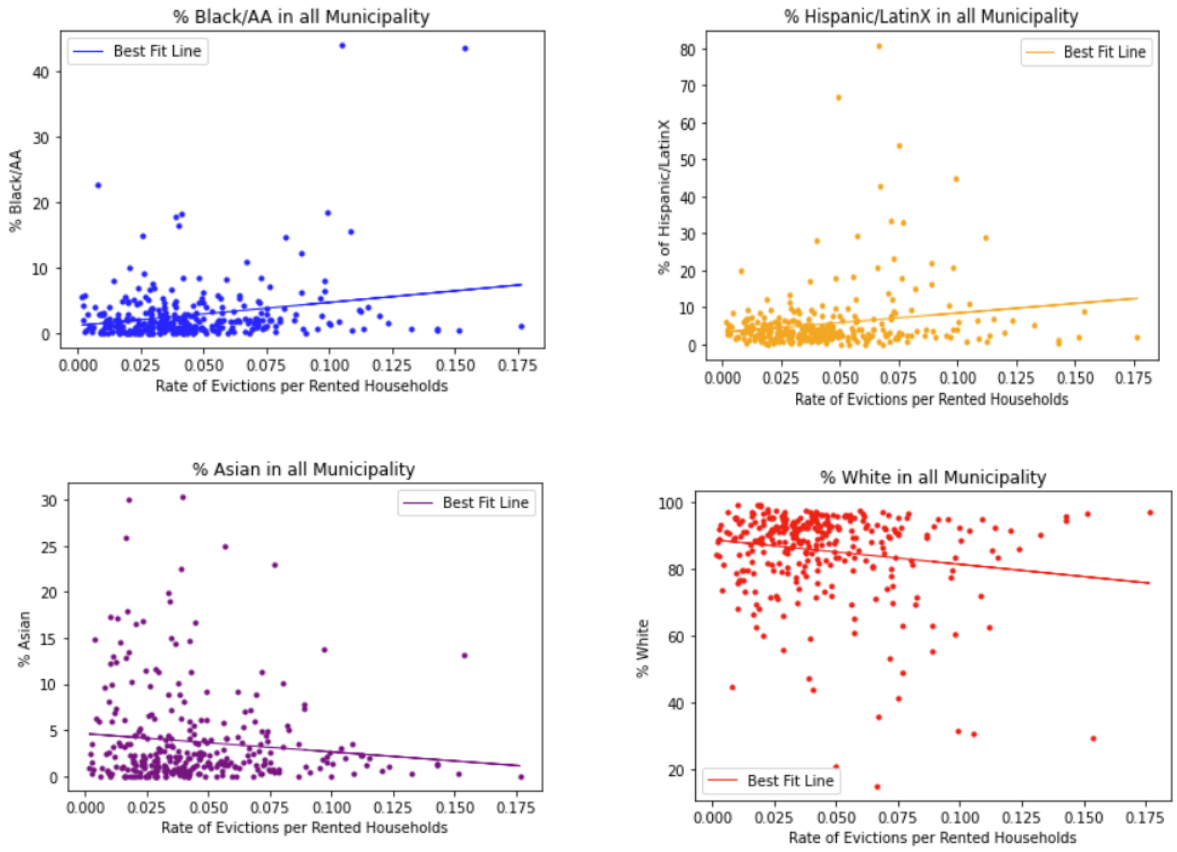

Figure 7 from race_profile_population_bracket.ipynb. race vs. eviction rate per rented household in all municipalities. Each point represents a municipality.

Regardless, it's important to note that when comparing all municipalities regardless of size, this plot shows that towns and cities with more proportion of people of color also have high eviction rates. However, this is a very loose analysis with low mathematical significance and correlation.

The degree to which they are impacted requires more analysis. Several sources show they are disproportionately impacted or suggest ways to build more robust models[8].

[7] https://www.census.gov/programs-surveys/household-pulse-survey/data.html
[8] https://evictionlab.org/demographics-of-eviction/_Final_20200101.pdf ,
https://www.mass.gov/doc/brockton-financial-management-review-november-2012/download

Geographic Pattern

Gateway Cities

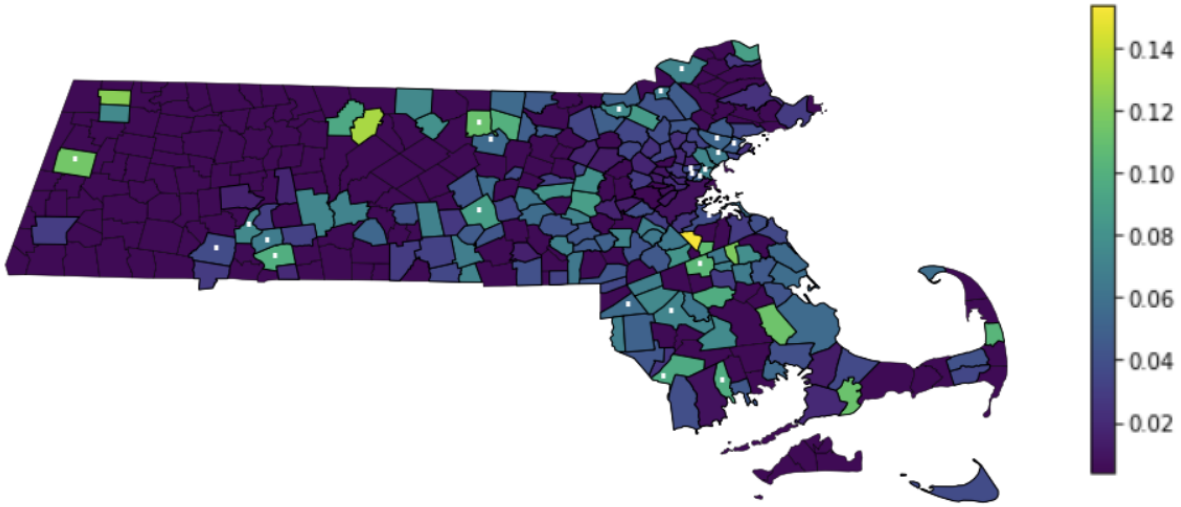

Figure 8. Eviction Rate per Rented Household Map.1 The annotated circle represents locations of gateway cities.

Gateway cities[9] are mid-sized urban centers, with higher populations of immigrant communities. For generations, the communities were home to industry that offered residents good jobs and a “gateway” to the American dream. However, in recent years, manufacturing jobs slowly disappeared. Thus, gateway cities have been slow to draw new economic investment.

Given their economic downfall, workers in gateway cities are more likely to engage in low-wage, high-contact service or essential jobs. The impact of the pandemic could surge in such cities. It also means they have fewer people able to work from home. Given its rising costs of homes and high poverty rates, we decided to focus our study on these cities. Furthermore, the increased demand for rent makes it an interesting case to study how landlords in such cities react. That could be done as future work. Together, these indicators of consistent demand, rising prices and high eviction rates affirm anxiety about displacement [10].

Gateway cities presented an interesting case. However, they are not the only case that needs support.

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[9] https://massinc.org/our-work/policy-center/gateway-cities/about-the-gateway-cities/
[10] https://commonwealthmagazine.org/opinion/eviction-rates-alarming-in-gateway-cities/

Race & ethnicity in gateway cities:

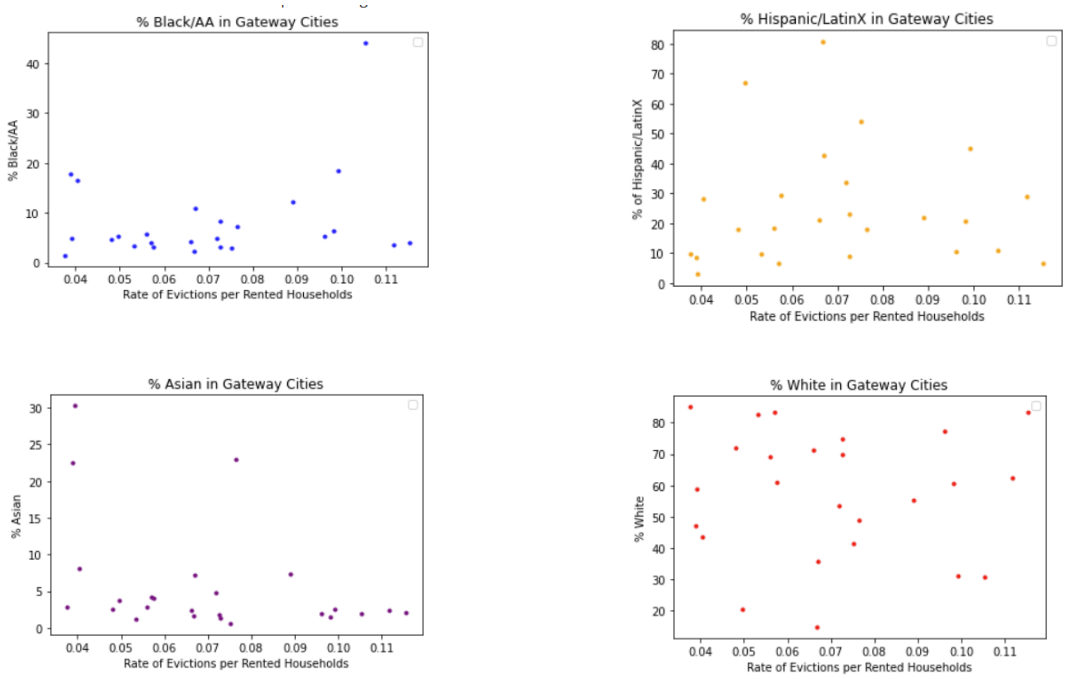

Figure 9. race vs. eviction rate per rented household in gateway cities.

As figure 9 shows, gateway cities have a large Hispanic/Latinx and white population. They have fewer black/AA residents, with the exception of Brockton. We observed that Brockton has the highest eviction rate per rented household in population bracket 4 (90k-200k).

Brockton is located in Norfolk country, MA, as figure 3 shows. In 2020, it experienced a major peak in eviction filings that several people took action to combat.[11] Understanding whether the policy efforts are enough required more research.

Gateway cities have higher evictions (gateway cities are italicized)

Top 5 municipalities in eviction rate in total population 50k to 90k (population bracket 3):

Municipality	Eviction Numbers	Renter Occupied	Evictions per 1000 Rented Households

[11] https://commonwealthmagazine.org/opinion/eviction-rates-alarming-in-gateway-cities/

Fall River	***2355***	***24496***	***96***
Framingham	1154	13010	88
Haverhill	***757***	***10405***	***72***
Revere	***691***	***9630***	***71***
Lawrence	***1194***	***17911***	***67***

Top 5 municipalities in eviction rate in total population 90k to 200k (population bracket 4):

Municipality	Eviction Numbers	Renter Occupied	Evictions per 1000 Rented Households
Brockton	***1507***	***14317***	***105***
Springfield	***2983***	***30095***	***99***
New Bedford	***2282***	***23255***	***98***
Worcester	***3743***	***42026***	***89***
Lowell	***1741***	***22745***	***76***

Figure 10. Gateway cities with the highest eviction rates in municipalities with high populations.

As shown in figure 10, gateway cities have the highest eviction rates in population brackets 3 and 4, with the exception of Framingham in the 50k-90k bracket. Gateway cities are generally seeing higher eviction filing rates in large municipalities.

Within population bracket 4, there are seven gateway cities and one metro-core city, Cambridge. While in population bracket 3, there are 17 municipalities. Four out of five municipalities with the highest eviction rate per rented household are gateway cities.

There are a few gateway cities with smaller populations, and these also face economic issues. However, we observed in our dataset that their eviction rates per rented household are not as high, in 2020-2021, compared to other municipalities within their population brackets (see the complete list in appendix).

Gateway cities vs. Statewide Average:

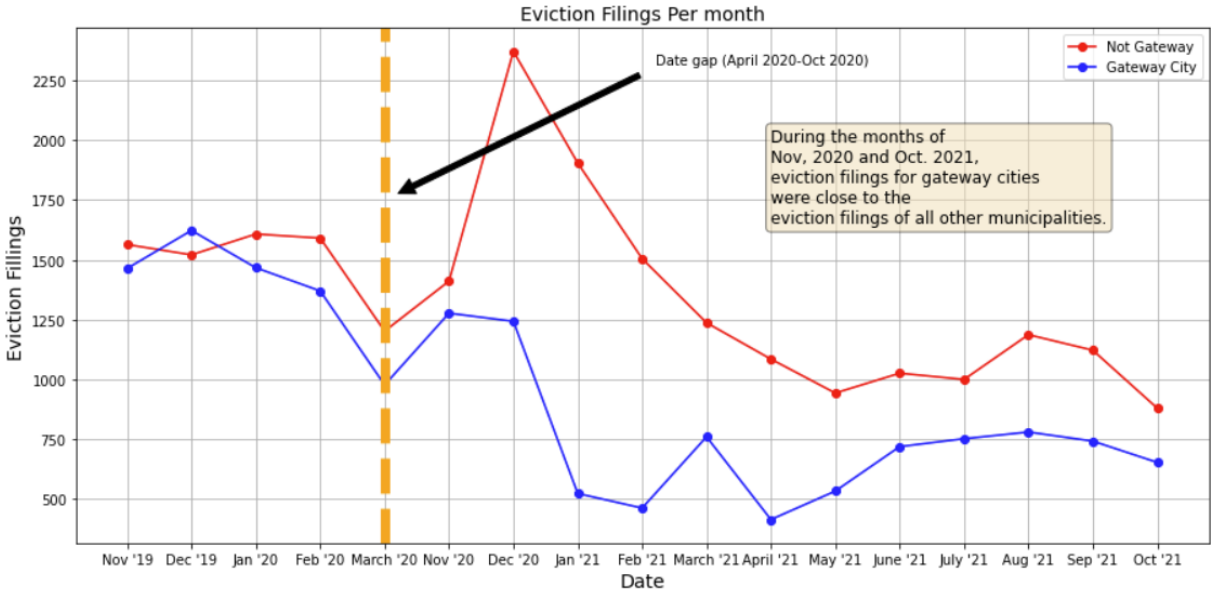

Figure 11. Eviction Filings by Month gateway cities and none gateway.

The eviction filings rate per 1000 rented households for gateway cities ranges from 115 to 38. The highest eviction rate per rented household is Pittsfield, the fifth-highest rate compared to all municipalities.

Figure 11 shows that during Nov 2020 and Oct. 2021, the eviction filings were close to the eviction filings of all other municipalities, despite gateway cities only being 26 out of over 200 municipalities in Massachusetts.[12] There is no increase in fillings for gateway cities after the end of state moratorium. The decrease between december 2020 and January can be due to receiving rental assistance or the initiation of city moratoriums. It's important to note that gateway cities are large municipalities. In fact, most municipalities with populations over 90 thousand are gateway cities.

Randolph: Highest Eviction Rate per rented household

Out of all municipalities, we found that Randolph had the highest rate of evictions per rental households. It has a small population size of 34064 residents, with a Black/AA population of 43.3% and 56% of the population are people of color. Of the "traditional" suburban areas,

[12]**Note:** it could be interesting if data can be collected for months April-Oct 2020 for a clearer trend comparison.

Randolph has been a long-standing destination for Black/AA families pushed/priced out of Boston. Although big enough to be a city, it has retained the town form of local government.[13]

	Randolph	Massachusetts Average
Median Income	$55,255	$62,843
% Foreign-born	35.5%	13%
% Rent Burden	56%	
% Married Couples household[14]	44.2%	47.1%
% Cohabiting couple households	5.0%	6.7%
Average Family Size	3.6	3.12

	% Families in Poverty in Randolph (2019)[15]	% Families in Poverty in Massachusetts (2019)[16]
White Families	9.3%	8.3%
Black/AA Families	8.7%	18.7%
Asian Families	4.9%	12.8%
Hispanic/Latinx Families	12.4%	24.5%

Figure 12. Randolph demographic profile compared to state average. Source US Census Bureau (2019)

Demographic characteristics such as income, poverty, race and ethnicity, and similar factors are important in understanding the profile of the city. Upon early analysis, it was observed that although Randolph has a sizable middle class, It's median income is lower than the state of massachusetts.

One third of Randoph's population are born outside of the U.S. This is important to see as eviction rates among foreign-born as significantly more complicated. For example, there is a possibility they might leave the property to avoid being in court. [17]

An average resident of Randolph pays 56% of their income for rent. This means the average resident is significantly rent-burdened. The acceptable rate is 30% of income paid for rent. Therefore, it is important to understand the composition of the household as households

[13] https://www.mapc.org/wp-content/uploads/2020/01/Randolph-CWP_Final_20200101.pdf
[14] ***Note:*** *Percentage of married couples does not correlate with percent of married couples renting a home.*
[15] https://data.census.gov/cedsci/table?q=poverty&g=0400000US25_0600000US2502156000
[16] https://data.census.gov/cedsci/table?q=poverty&g=0400000US25_0600000US2502156000
[17] https://www.mapc.org/wp-content/uploads/2020/01/Randolph-CWP_Final_20200101.pdf

with more people under 18 will be more impacted. However, there is a lack of data for family composition of those renting a home in the US Census Bureau website.

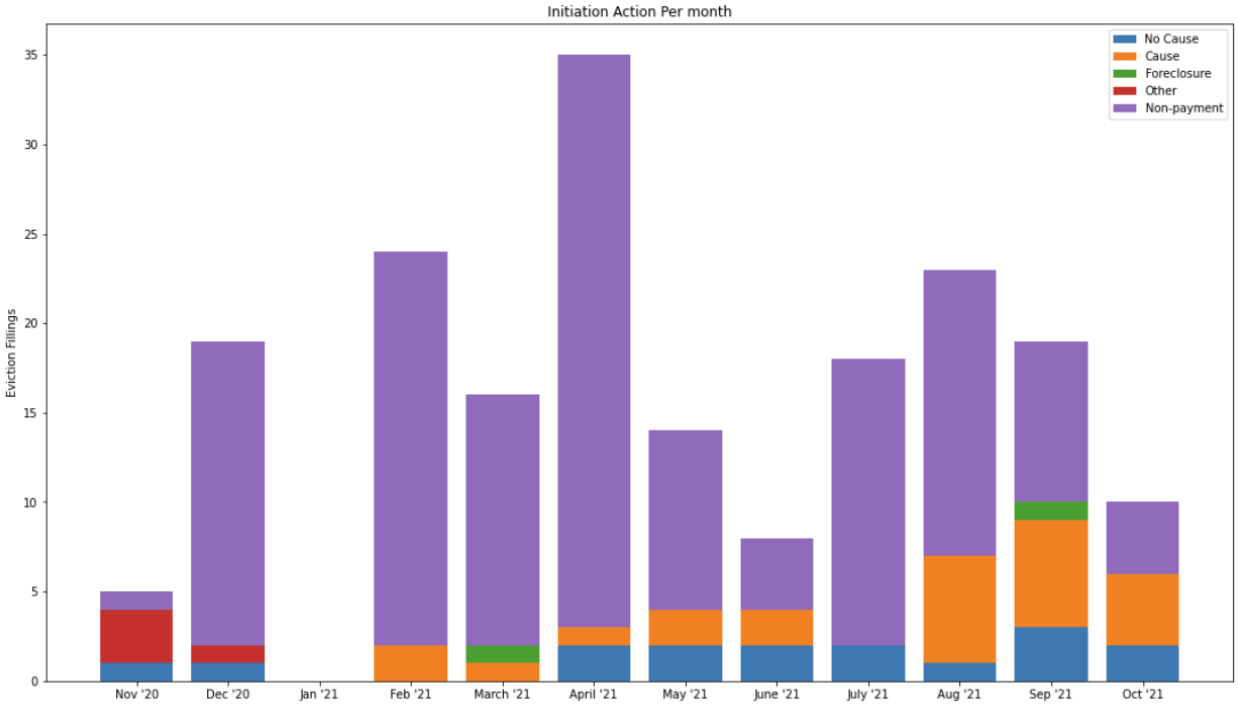

Figure 13. Eviction Filings per month for Randolph. It includes causes of eviction.[18]

Several factors may be influencing these trends, including the varied success of rent relief efforts from place to place, the presence of local moratoria banning eviction filings for non-payment, and differences among housing courts and district courts across the state. Regardless, there is a peak of evictions in April 2021, where the majority of reasons are due to non-payment.

Upon earlier analysis, I observed that Randolph had a larger number of filings at the end of 2019 and the beginning of 2020. Given the high rate of filings, an alternative explanation is that public policy worked and limited actual eviction (removal from housing). This would make a great follow-up study focusing on cities like Randolph, Athol, and others that could possibly have had progressive policies protecting both landlord and tenant.

[18]**Note:** I was unable to find whether Randolph had a city moratorium.

Project Evaluations

Key Findings

1. Most eviction initiation types are due to nonpayment. However, the past few months have seen an increase in evictions for other reasons. More specifically, there is an increase in no-cause evictions. **It might be best to distinguish between different initiation types or filter them** in order to help the municipalities that *need* financial assistance or other types of support.
2. Looking into a few municipalities with worse cases of evictions, we observed that some of them have a decreasing number of eviction filings after the current state moratorium, meaning they might be already provided with the help they need. This suggests that comparing municipalities with the highest eviction rates per rented household in different time-frames or changing policies can be another direction, to assist those still in need at the end of 2021.
3. We observed that Randolph and gateway cities with high eviction rates have several things. Some are rising rent prices and a large population of immigrant communities.

Limitations

1. All of the analysis above is based on the generalization with census tract data. We use population information in each municipality and generalize the evicted profiles. It would be more accurate if we had specific details on evicted individuals. Since it is hard to get, it might be a limitation. **That is especially important for family composition.**
2. We started with data that did have landlord information and found it unreliable. Then we received more complete data to use. However, it did not have landlord information. Regardless, we found that small landlords can have an LLC title and not be a corporation, which could be a limitation.
3. The reliability of US census pulse data might not be strong as it has a high marginal error. Regardless, it would help to better understand the degree of house instability in the state of Massachusetts.

Future Steps

Main next steps:

1. Analysis of the evictions filed by landlords that are corporations can be performed on the new scraped dataset.
2. Analyze the eviction experience using court data, i.e., who received a notice to quit and when they received it.
3. Compare the average payment owed for each municipality in court data with the rental assistance support they receive and identify who is not receiving aid.
4. Identify the Massachusetts profile compared to other states, i.e., compare eviction rates of major cities and policies.
5. We can try to analyze eviction trends based on policies that have been implemented.
6. Identify the family composition of only the tenants who received eviction notices. Renters who didn’t receive eviction notices should not be included in the analysis. If not possible,

use only *renter-related* census data regarding family composition. **Note:** rural areas could have fewer rental spaces than urban areas.

7. Since Boston has very low eviction rates and since the population there is much larger than others, we decided not to analyze it at this time, but it deserves deep analysis for its huge population and other notable characteristics.

Additional next steps:

1. Time-series analysis would be more beneficial for understanding trends and patterns.[19]
2. Identify whether there are addresses/buildings with large concentrations of eviction filings.
3. The increased demand for rent in gateway cities makes it an interesting case to study how landlords in such cities react.
4. Build interactive maps. It would be easier for analysis and great visualization. There are several tools available, such as Tableau and folium.
5. Immigrant communities may have a complicated eviction experience. Therefore, to help paint a bigger picture, we could use US census pulse data to identify properties like the number of people behind on rent and fear of getting evicted. In addition, we could use court data regarding the number of notices to quit of those who did not file an eviction.
6. Analyze house properties, i.e., lease price, unit number, type of property, with payment owed column to understand the severity of eviction.
7. I found that cities with high eviction rates have a thing in common, rising rent prices. Identifying those areas might be beneficial as high eviction rates may persist in such areas. [20]

[19] Useful source: https://www.tbf.org/news-and-insights/reports/2021/jun/greater-boston-housing-report-card-2021/gbhrc2021-chapter-2

[20] Useful source: https://www.tbf.org/news-and-insights/reports/2021/jun/greater-boston-housing-report-card-2021/gbhrc2021-chapter-3

Appendix

A. Visualizations:

[1] *Income & Housing maps*:

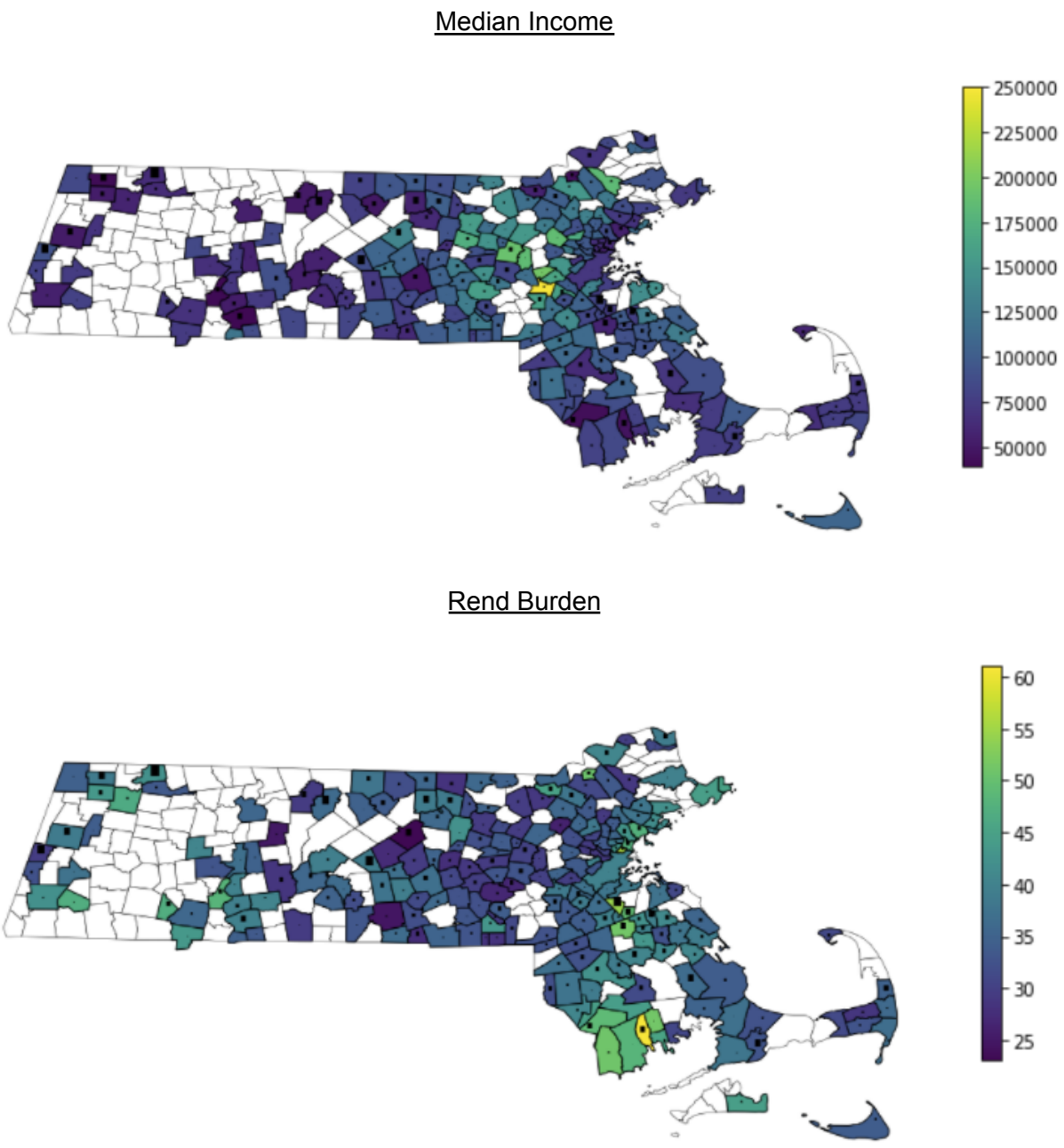

Figure 15. Rent burden and a median income of Municipalities with more than ten evictions.
Note: the larger the circle, the higher the rent per rented household in Municipality.

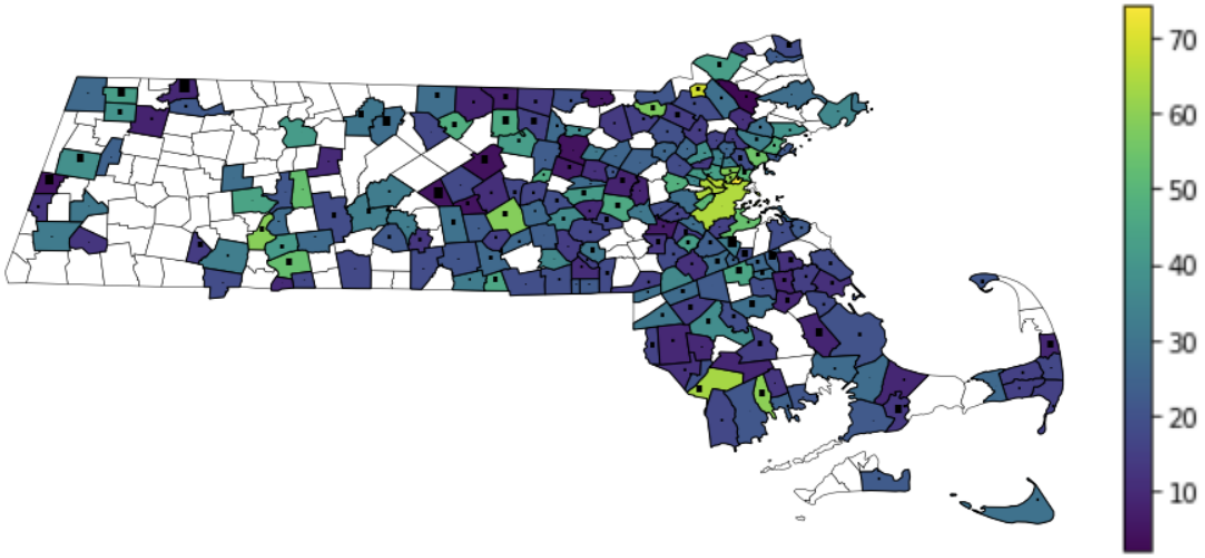

Figure 14. Percent rent occupied in each Municipality with more than ten evictions. *Note:* the larger the circle, the higher the Eviction rate per rented household in Municipality.

Figure 14 is meant to show areas that have an increasing demand for rent. Figure 15 how much each area pays for rent as a percentage of their income.

[2] *Economic Factors:*

Economic features are essential to eviction analysis because, according to the table of the count of each eviction type (Figure 4), most tenants were evicted due to non-payment of rent. Therefore, it is likely that evictions are highly related to economic status.

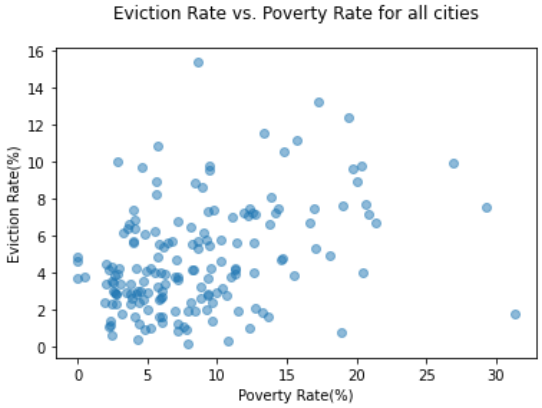

Figure 15. Eviction Rate vs. Poverty Rate for All Cities.

We analyzed the impact of the poverty rate and the unemployment rate on the eviction rate. Initially, we tried to find the effect of median household income on the eviction rate. Still, we could not observe any clear trend, and the reasons might be that the rental price levels of cities vary with their income levels. Therefore, housing affordability would not be adequately reflected based on median income.

The poverty rate would be a better feature because the poverty line of each city varies with their median income levels. Therefore the poverty rate is able to reflect the proportion of people in each city who have low affordability. We used the eviction dataset from mass landlords and the ACS income dataset[21] to plot the eviction rate against the poverty rate as shown, and we can observe a positive trend as shown in Figure 15 above.

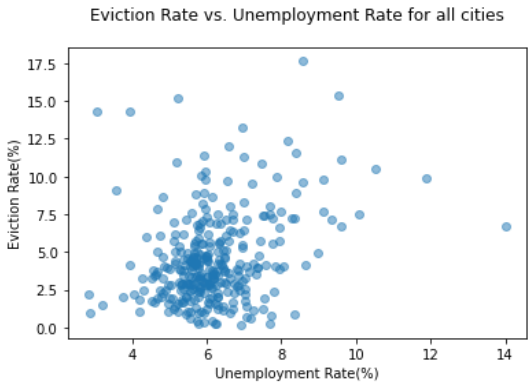

Figure 16. A comparison plot for Eviction Rate Unemployment Rate for All Municipalities.

We postulate that the evicted are people who lost their jobs and could not afford the rent. We again plotted the eviction rate against the unemployment rate[22] shown in Figure 16, and we observed a positive trend that was clearer than the poverty rate. Regardless, we cannot be sure but the data suggests this conclusion.

[3] *Gateway cities per Population Bracket*

Gateway cities in 10000 to 50000 population bracket		**Gateway cities in the 50,000 to 90,000 population bracket**		**Gateway cities in the 90,000 to 200,000 population bracket**	
Municipality	**Evictions per 1000 Rented Households**	**Municipality**	**Evictions per 1000 Rented Households**	**Municipality**	**Evictions per 1000 Rented Households**
Pittsfield	116	Fall River	96	Brockton	105

[21] Poverty rate data source: https://data.census.gov/cedsci/table?q=poverty%20rate&t=Income%20and%20Poverty&g=0400000US25%24160000&tid=ACSST1Y2019.S1701

[22] Employment data source: https://dlsgateway.dor.state.ma.us/reports/rdPage.aspx?rdReport=dashboard.category_5

Fitchburg	112	Haverhill	73	Springfield	99
Holyoke	75	Taunton	73	New Bedford	98
Attleboro	57	Revere	72	Worcester	89
Leominster	56	Lawrence	67	Lowell	77
Chelsea	50	Chicopee	66	Lynn	67
Salem	48	Methuen	57	Quincy	39
Everett	40	Peabody	53		
Westfield	38	Malden	39		

[5] *Highest and Lowest Rates in Each Population Bracket*

A couple of interesting cases we looked at were the cities and towns in each population bracket that had the highest and lowest eviction rates. For populations below 10,000, the town with the lowest eviction rate was Lenox, while the highest was Rowe. For populations between 10,000 and 50,000, the town with the lowest eviction rate was Barnstable, while the highest was Randolph. For populations between 50,000 and 90,000, the city with the lowest eviction rate was Newton, while the highest was Fall River. For populations above 90,000, the city with the lowest eviction rate was Boston, while the highest was Brockton.

Something common among the four municipalities with the lowest eviction rate in its population bracket is that all contain a majority white population, with Boston being the only one where they are not an overwhelming majority. On the other side of things, Fall River and Rowe are also majority White, but Randolph and Brockton are mainly Black/African American. Another interesting point to note is that Fall River and Brockton are both gateway cities, and none of the ones with the lowest eviction rate in their population bracket are gateway cities. In terms of educational attainment, all of the municipalities with the lowest eviction rate mainly have people who have attained a bachelor's degree or higher, while in all of the municipalities with the

highest eviction rates, the largest group of people is those who have a high school diploma as their highest level of educational attainment.

Income level is another interesting factor: Randolph and Barnstable have very similar income distributions, both skewed towards the higher end of incomes (>$50,000). It could be due to lower rent prices or other factors. Newton and Boston also have income distributions skewed towards the higher end, while Fall River and Brockton are skewed towards the lower end. Lenox and Rowe both have a relatively normal (Gaussian) distribution of income.

[6] *Highest Rates in Population Bracket 1 and 2*

Population: 1 thousand to 10 thousand

Muni	Eviction Number	Eviction Rate Per 1000 Rented Household
Eastham	23	103
Orange	90	95

Population: 10 thousand to 50 thousand

Muni	Eviction Number	Eviction Rate Per 1000 Rented Household
Randolph	584	153
Athol	172	132

B. GitHub Link: https://github.com/BU-Spark/ds-state-ma-housing-comitt/tree/group1-finalreport

C. Dataset Names/Usage:
[1] Group 1/eviction data: Housing Docket Dataset 2 - Usage: File_date, initiating_action, property_address_city
[2]Group 1/municipality profile: Municipalities in Massachusetts Census tract data (in folder Muni_Profile ACS 5-Year Estimates Subject Tables(population, income, occupation, education, households).[23]: income dataset for income profile, population dataset for race profile, households dataset for normalization eviction counts per municipality.
[3]Group 1/eviction cases data: race, income, and household profiles merged with eviction_num_by_muni.csv dataset.

[23]https://data.census.gov/cedsci