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Effects of Rent Regulation on Housing Quality: Evidence from Manhattan

By

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Abstract

This study examines the effect of rent regulation on housing quality in Manhattan. In particular, this study investigates how a specific law change on rent increases due to home improvements in the Rent Act of 2011 affected the rental housing quality in Manhattan. Through combining multiple sources of data, including complaints received by the Department of Housing Preservation and Development (HPD) and the Department of Buildings (DOB) and building information scraped from NYC public databases, I construct a novel longitudinal dataset with identifiable information of each building and the number of complaints each building receives as a measure of housing quality. Using a combination of regression discontinuity and difference-in-differences, this study shows that the specific law change in the Rent Act of 2011 has a negative effect on the housing quality of the associated rent-stabilized buildings in Manhattan. While previous literature has not reached an agreement on how rent regulation affects housing maintenance and improvements, this study aims to contribute to this discussion with novel data and analyses.

keywords: Rent stabilization, rent regulation, housing quality.

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1 Introduction

Rent regulation has been an important housing policy in metropolitan areas like New York City. While the goal of such a policy is to make housing more affordable, studies have found that rent regulation may have an unexpected negative impact on the housing market (e.g., Asquith (2019); Diamond, McQuade, and Qian (2019)). More specifically, previous literature has come to a disagreement in terms of how rent regulation affects housing quality: while some literature finds that rent regulation has a negative impact on housing quality (Moorhouse, 1972; Albon & Stafford, 1990; Gyourko & Linneman, 1990), some literature suggests that such an impact is limited (Rydell, Barnett, Hillestad, Murray, & Neels, 1981; Olsen, 1988). To contribute to this discussion, this paper aims to provide empirical analyses on whether rent regulation in Manhattan has a negative impact on the housing quality of rental units.

Especially when the rent regulation policy attempts to limit the increase of rent caused by home improvement, it is possible that such a policy would have some direct impact on the housing quality in the local rental market. This is precisely in the rent stabilization policy of New York City. Rent stabilization in New York City has specific requirements on rent increase due to home improvements. The Rent Act of 2011 also made specific changes to such requirements. Compared with prior versions of the rent stabilization policy, the Rent Act of 2011 includes some amendments that further protect tenants against rent increases. In particular, there would be less rent increase if apartment improvements were made. The landlord can permanently increase the regulated rent by 1/60 of the cost of the improvements if the building has more than 35 apartments. This rate used to be 1/40 under the prior Rent Law (Rent Guidelines Board, 2011). Therefore, the specific question that this paper attempts to answer is: how does the law change on rent increase due to home improvements in the Rent Act of 2011 affect the rental housing quality of rent-stabilized buildings? For this study, I focus on rent-stabilized buildings in Manhattan.

The main novelty of this study is the use of new data. Through combing multiple sources of data, including complaints received by the Department of Housing Preservation and Development (HPD) and the Department of Buildings (DOB) about each building and building information scraped from NYC public websites, I construct a novel longitudinal dataset with identifiable information of each building and the number of complaints each building receives as a measure of housing quality. Using a combination of regression discontinuity and difference-in-differences, this study shows that the specific law change in the Rent Act of 2011 has a negative effect on the housing quality of the associated rent-stabilized buildings in Manhattan.

The following sections are structured as follows. Section 2 reviews relevant literature in this field and the main discussion that this paper is contributing to. Section 3 contains an overview of the rent regulation policy in New York City and my hypothesis about the effect of the policy change. Section 4 describes the data collection process and the methods I use. Section 5 presents the results of this study and robustness checks of the results. Section 6 discusses the implications and potential limitations of this study. And finally, Section 7 summarizes this study and potential implications for future work.

2 Relevant Literature

The study of the housing market is not new in any way. In particular, the private rental market has been a focus of study for decades. For renters, rent and its fluctuations are in no doubt key factors in household decision making. Renters constantly need to make decisions and try to find a balance between better housing quality and higher rent. As renters are more likely to be pushed into the market by changes in their own life and changes in the market (Kendig, 1984), the search for high-quality housing at an affordable price is a non-stop process for many renters. Landlords, on the other hand, need to maximize their profits when setting and changing the rent. As the probability of finding a tenant decreases as the rent increases for a rational landlord with a vacant unit (Stull, 1978), landlords also need to seek a balance between providing better quality housing and higher cost.

What determines the rent is a mechanism where many variables contribute to the process, including variables that naturally influence the rent as a part of the market as well as measures that are imposed on the market to regulate and adjust the rent. The natural influencing factors, such as spatial factors (Dubin & Sung, 1987), vacancy rates in the local market (Igarashi, 1991), and quality of the dwellings have a certain level of impact on rent. In studying these factors, many studies have focused on the hedonic analysis of rent (Buchel & Hoesli, 1995; Hoesli, Thion, & Watkins, 1997). For example, Larsen and Sommervoll show that rent is also influenced by the characteristics of landlords and tenants and the interactions between them – small-scale landlords may be more willing to reduce rent for tenants with good credibility than large-scale landlords

(Larsen & Sommervoll, 2009).

Besides these natural influencing factors that are crucial to the determination and changes of rent, another significant instrument that influences rent changes is the policies designed to regulate and adjust the rental market. More specifically, rent regulation[1] has been implemented in various social settings with the general goal of suppressing rent increases. However, there have been debates about the effects of such rent regulation policies among policymakers and scholars (Epstein, 1988). From an economic perspective, studies have shown that rent regulation may have some negative impact on the local housing market, such as misallocations (Glaeser & Luttmer, 2003), reduction in rental supply (Diamond et al., 2019), housing gentrification (Harvard Law Review Association, 1988; Diamond et al., 2019; Asquith, 2019), and unsound housing quality or even harassment (Moon & Stotsky, 1993; Ye et al., 2019). It is interesting to see two recent studies on this topic of Diamond et al. and Asquith coming to similar conclusions about rent regulation in San Francisco using different data and models. Combining data from multiple sources, including address history, property records, and parcel data, Diamond et al. find that landlords in San Francisco respond to the imposition of rent regulation by converting the properties or redeveloping the building to be exempt from rent control (Diamond et al., 2019). Asquith, on the other hand, uses data from different government agencies to test if landlords tend to evict the tenants under rent regulation. He finds no evidence of landlords evicting their tenants when facing rent regulation, but there is

[1] In much of the previous literature, such policies are referred to as rent control. In the case of NYC, the term "rent control" specifically refers to one of the main rent regulation programs. To avoid confusion, I use rent regulation to categorize all policies that regulate rent.

evidence that landlords tend to redevelop their properties for rent regulation exemptions (Asquith, 2019).

Although it is exciting to see such consistency in the findings of recent work, questions remain unsolved regarding the impact of rent regulation on housing quality. Scholars have made efforts to understand whether or how rent regulation policies influence the level of housing maintenance, yet the results are mixed. Some studies show that landlords tend to ease the burden of rent regulation by lowering the level of maintenance of their dwellings (Moorhouse, 1972; Albon & Stafford, 1990; Gyourko & Linneman, 1990), while others question such results and argue that rent regulation has a limited impact on the level of housing maintenance (Rydell et al., 1981; Olsen, 1988)).

It has been shown that if the rent regulation policy allows housing maintenance to be evaluated at its market price, then landlords under rent regulation are expected to provide the same level of housing maintenance as when there was no rent regulation (Kutty, 1996). But the assumption made here seldom holds. In reality, one of the many forms of rent regulation is to limit the increase in rent caused by housing maintenance. And this is exactly the case in New York City. One of the major changes in the Rent Act of 2011 of New York City compared with prior policies is that there should be less rent increase if the landlords had made home improvements for buildings with 35 or more units (Rent Guidelines Board, 2011).

Thus, the first contribution of this study is to provide empirical analyses to further explain how rent regulation affects housing quality as there has been no clear answer to this question. This study investigates how landlords/tenants react to rent regulation if housing maintenance would not be evaluated at its market price.

Another contribution that this study aims to make is to further study the case of New York City with new sources of data. In the past, many scholars have focused their attention on New York City and use the data of New York City to study the effect of rent regulation, where the private housing rental market is an important part of life and also a significant part of policy-making. Most of these studies use data from the New York City Housing and Vacancy Survey (NYCHVS) conducted by the New York City Department of Housing Preservation and Development for several decades (Desalvo, 1971; Olsen, 1972; Gyourko & Linneman, 1990; Early, 2000). The New York City Housing and Vacancy Survey is not the only source of available data and it has its shortcomings. The biggest challenge of using NYCHVS data is that in its public version, there is no publicly available identifiable information of each unit or building that is consistent across different waves of the survey. In other words, we cannot obtain longitudinal data of individual buildings or units and investigate how the housing quality has changed throughout the years from NYCHVS. To tackle this problem, this study makes use of data from NYC Open Data and other public websites of housing departments and constructs a novel dataset that satisfies our requirements.

3 Overview of Rent Regulation in NYC

According to the New York City Rent Guidelines Board, 62.9% of NYC's available housing stock are rental units, among which 57.1% are rent-regulated (Rent Guidelines Board, 2021). There are mainly two forms of rent regulation in New York City, rent control and rent stabilization. Rent control has a longer history compared with Rent Stabilization and is applied to buildings built before February 1, 1947, where the tenant lives continuously prior to July 1, 1971. Rent stabilization, on the other hand, generally applies to buildings of six or more units built between February 1, 1947 and December 31, 1973 and apartments removed from rent control. It also applies to a few buildings with certain tax benefits (NYS Homes and Community Renewal, 2020). By 2020, among the rent-regulated units in NYC, 77.4% of them are rent-stabilized, 1.8% are rent-controlled, and others (20.7%) are regulated under various smaller programs (Rent Guidelines Board, 2021).

Both rent control and rent regulation limit rent increases. Every few years, the regulatory authority would make changes to the standard of rent increases of these rent-regulated units. The five most recent law changes took place in 1997, 2003, 2011, 2015, and 2019. In particular, the Rent Act of 2011 includes some amendments that further protect tenants against rent increases by limiting the rent increase due to home improvements. After this law change took place, there would be less rent increase if apartment improvements were made. The landlord can permanently increase the regulated rent by 1/60 of the cost of the improvements if the building has more than 35 apartments. This rate used to be 1/40 under the prior Rent Law (Rent Guidelines Board, 2011).

Then the natural question is whether this kind of rent regulation policies would affect the housing quality of rental units, especially when it specifically regulates the rent increases due to home improvement. On the one hand, landlords may be reluctant to provide housing maintenance and improvements services for tenants in rent-regulated units when they are not allowed to significantly increase the rent. Even though theoretically rental units can also get deregulated after the rent reaches a certain threshold (before 2019), landlords may still be more reluctant to provide home improvement services when the rent increase allowed due to such services is reduced, as directed by the Rent Act of 2011. On the other hand, rental units can get deregulated upon vacancy in some situations, so landlords may refuse to provide home improvement when the tenant is still living in the apartment to force the tenant to move out. This is what has been reported in the media. There have been news articles about this negative side of the policy where tenants in rent-regulated units complain about the limited services that the landlords provide them with. The landlords would provide poor services and refuse to conduct home improvement until the tenants are forced to move out (Barker, 2018).

Here we assume that when there exist problems with a building, the tenants can easily file complaints. In fact, this has been the case in NYC. Tenants in NYC can easily file complaints by calling 311 or visiting the online filing platforms. Thus, all else being equal, we should expect to see more concerns or complaints about the housing quality of the rental buildings above the 35 cut-off after the Rent Act of 2011 came into effect. Especially around this sharp cut-off, we should expect to see some form of discontinuity about the housing quality.

4 Data and Methods

In order to understand how the quality of rental housing has changed throughout the years and how the Rent Act of 2011 may affect buildings differently, we need a longitudinal dataset with identifiable information of each building or unit and some measure of housing quality. Therefore, I construct a novel dataset by combining mainly three sources of data. For this project, I limit the scope of the research to buildings in Manhattan.

First, to identify which buildings have units that are rent-stabilized, I utilize the lists of rent-stabilized buildings published by the Rent Guidelines Board of NYC Government, which contain the information of buildings that have had rent-stabilized units. As data on individual units' current stabilization status is unavailable to the public, I consider buildings that have rent-stabilized units in them and investigate the housing quality and maintenance level of these buildings rather than the quality of individual units [2]. Table 1 are some examples from these lists.

Table 1: Example from the List of rent-stabilized Buildings in Manhattan

ZIP	BLDGNO1	STREET1	CITY	COUNTY	STATUS1	BLOCK	LOT
10001	246	10TH	NEW YORK	62	MULTIPLE DWELLING A	722	3
10001	299	10TH	NEW YORK	62	MULTIPLE DWELLING A	699	31
10001	301	10TH	NEW YORK	62	MULTIPLE DWELLING A	699	32
10001	303 TO 309	10TH	NEW YORK	62	MULTIPLE DWELLING A	699	33
10001	440	10TH	NEW YORK	62	MULTIPLE DWELLING A	732	73

Second, I obtain information of each building from NYCityMap, a publicly available map service of the New York City government. On NYCityMap, one can look up detailed

[2] I would like to point out that this is not a perfect list of rent-stabilized buildings. More details would be discussed in the Discussion section.

information of buildings by their addresses and other identifiable information. I constructed a web-scraping program and obtained the relevant information of each building that has appeared on the lists of rent-stabilized buildings, including the number of units in that building. Table 2 is an example of the scraped data. Out of the 13447 unique buildings in Manhattan that appeared on the Lists of Rent-Stabilized buildings, I was able to obtain complete information of 13307 buildings [3]. Among these buildings, 12406 were built before 1974 and contained six or more units, which would be the total size of the building sample[4].

Table 2: Example of the scraped building information

BIN	year	# bldg	# floor	borough	block	lot	lotarea (sf)	bldgarea (sf, estimated)	# residential units	# total units
1005846	1900	1	5.0	1	435	40	2437	7513	8	10
1077837	1930	3	6.0	1	550	27	6000	12628	4	15
1007922	1910	1	5.0	1	509	26	5087	25480	30	32
1030124	1900	1	4.0	1	1147	17	2043	6011	9	9
1047594	1915	1	5.0	1	1510	69	2516	11460	9	11

N = 12406

Finally, to measure the housing quality, I use two datasets that contain the complaints received by the housing authorities. The first dataset that I use is the Housing Maintenance Code Complaints recorded by the Department of Housing Preservation and Development (HPD). These complaints are directly associated with the housing maintenance

[3]Manually searching for the missing buildings' information, I found that these 136 missing buildings cannot be found in the relevant database used for this project. I suspect this is due to demolition or other changes made by city planning. There are also four buildings whose building years are unknown. As the year when the building was built could be important for the analysis, I excluded these four buildings.

[4]We use the Borough (Manhattan), Block and Lot number (BBL) to identify the buildings and obtain their information. This number could be passed on to a new building built on this site when the old building is demolished. As the rent stabilization policy specifies that only apartments in buildings built before 1974 and that have six or more units would be considered rent-stabilized, I only select buildings that meet these requirements from the data.

services that landlords provide for their tenants, for example, problems with appliances, heating, plumbing, etc. These complaints can be reported by the residents, or they can be filed during inspections. For each complaint, this dataset contains the address of the building and unit, including the borough, block, and lot (BBL), and the date when this complaint was recorded. By the end of 2020, this dataset contains 2,267,657 complaints that date back to 2003, among which 504,853 are about buildings in Manhattan. Table 3 are some examples of these maintenance complaints received by HPD.

Table 3: Example of the maintenance complaints received by HPD

Complaint ID	Building ID	Borough	Zip	Block	Lot	Apartment	Community Board	Received Date	Status	Status Date
7419248	43103	MANHATTAN	10032	2125	53	5C	12	04/01/2015	CLOSE	04/13/2015
7419251	8283	MANHATTAN	10040	2180	505	BLDG	12	04/01/2015	CLOSE	04/03/2015
8320171	19122	MANHATTAN	10029	1677	40	1R	11	12/28/2016	CLOSE	01/20/2017
7419260	27333	MANHATTAN	10031	2092	46	3D	9	04/01/2015	CLOSE	04/10/2015
7419265	42166	MANHATTAN	10031	2079	21	1	9	04/01/2015	CLOSE	04/02/2015

Note: In order to compute the number of complaints per year, I select maintenance complaints from 2004 to 2020 as data are complete for these years. The total number of these complaints is 504,841.

The second dataset of complaints is the complaints received by the Department of Buildings (DOB) of New York City. This is a more comprehensive list of all types of complaints that the DOB has received. For each complaint, this dataset contains the address of the building, including the borough, block, and lot (BBL), and the date when this complaint was recorded. By the end of 2020, this dataset contains 2,784,594 complaints that date back to 1989, among which 610,994 are about buildings in Manhattan. Table 4 are some examples of these complaints received by DOB.

Table 4: Example of the complaints received by DOB

Complaint Number	Date Entered	ZIP Code	BIN	Community Board	Complaint Category
3672431	2018-10-22	11249	3421354	301	35
5136339	2018-08-07	10312	5817541	503	4S
1494617	2018-11-09	10028	1046666	108	6S
3674825	2018-11-09	11221	3821252	304	55
3668650	2018-09-24	11233	3038572	316	45

Note: In order to compute the number of complaints per year, I select maintenance complaints from 1989 to 2020 as data are complete for these years. The total number of these complaints is 590,514.

In my analysis, I use the number of complaints about a building as the measure of quality. I consider the number of maintenance complaints recorded by HPD for each building as a specific measure of the housing maintenance level (hereinafter referred to as Maintenance Complaints), and I consider the number of all types of complaints received by DOB as an overall measure of building quality (hereinafter referred to as Overall Complaints). Figure 1 illustrates how many complaints are about rent-stabilized buildings,

(a) Maintenance Complaints (b) Overall Complaints

Figure 1: Percentages of complaints about rent-stabilized buildings

In order to combine these three sources of data, I make use of two kinds of building identification numbers that are included in these three data sources, which are the BBL (borough, block, and lot) and the BIN number. Although all these datasets have the addresses of buildings, such as the street name and number, it would be difficult to match buildings across datasets using these addresses as they can be recorded differently in different datasets. Some buildings may even have multiple addresses. Using BBL and BIN numbers to identify buildings in different datasets solves this problem. Each building in New York City has a unique BBL and a unique BIN number. In the lists of buildings with rent-stabilized units and the dataset of maintenance complaints, buildings are identified using BBL. In the overall complaints dataset from the Department of Buildings, each building is identified using the BIN number. To match these two datasets, I use the BBL of each building to look for its BIN number on the Buildings Information Search System of DOB.

In summary, we have the complete information of 12406 buildings in Manhattan that have had rent-stabilized units, including the year each building was built, the number of units in the building, etc. For each of these buildings, we have information of two types of complaints: the Maintenance Complaints and the Overall Complaints that have been received by HPD and DOB, respectively. And we are able to compute the number of Maintenance Complaints that each of these buildings has for a certain year (2004 - 2020) and the same for the Overall Complaints (1989 - 2020) [5].

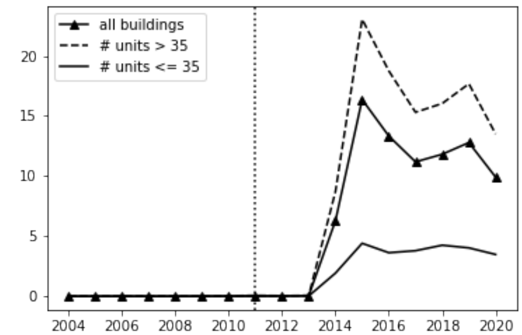
[5] These datasets that I constructed can be found here: Manhattan Rent Stabilized Buildings and Complaints Datasets.

Table 5: Summary Statistics of the Buildings

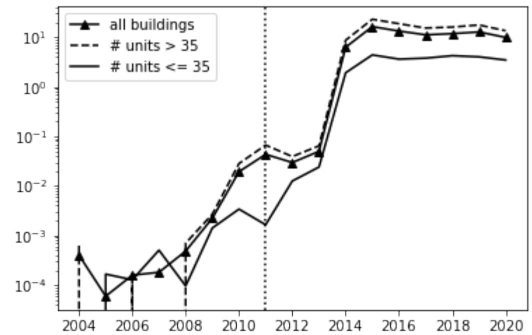
	year	# bldg	# floor	lot area (sf)	bldg area (sf, estimated)	# residential units	# total units
mean	1915	1.13	6.00	5779.95	30163.03	33.66	35.12
std	14.84	0.72	3.33	26819.92	102956.49	98.73	99.67
min	1830	1.00	0.00	376.00	1580.00	0.00	6.00
25%	1902	1.00	5.00	2356.00	8200.25	10.00	10.00
50%	1910	1.00	5.00	2750.00	11554.00	19.00	20.00
75%	1920	1.00	6.00	5570.25	24791.00	32.00	34.00
max	1973	40.00	57.00	2675000.00	8942176.00	8764.00	8812.00

N = 12406

Table 5 presents some summary statistics of the buildings in the sample. The average number of total units is around the cut-off of 35 specified in the Rent Act of 2011. Figure 2 and Figure 3 show the trends of number of Maintenance Complaints throughout the years. Figure 4 and Figure 5 show the trends of number of Overall Complaints throughout the years. From 1989 to 2020, both the number of Maintenance Complaints and the number of Overall Complaints about these rent-stabilized buildings have increased in general, and there may exist parallel or similar trends among the different groups, which would be further analyzed in Section 5.

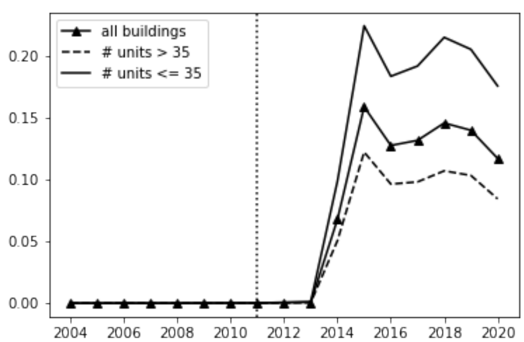


(a) Average

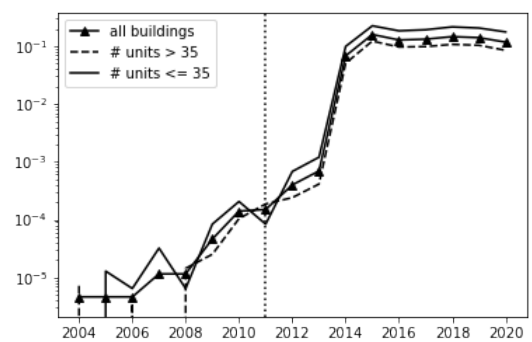


(b) Log Average

Figure 2: Average and log average number of Maintenance Complaints per year per building from 2004 to 2020 (weighted by total number of units in each building)

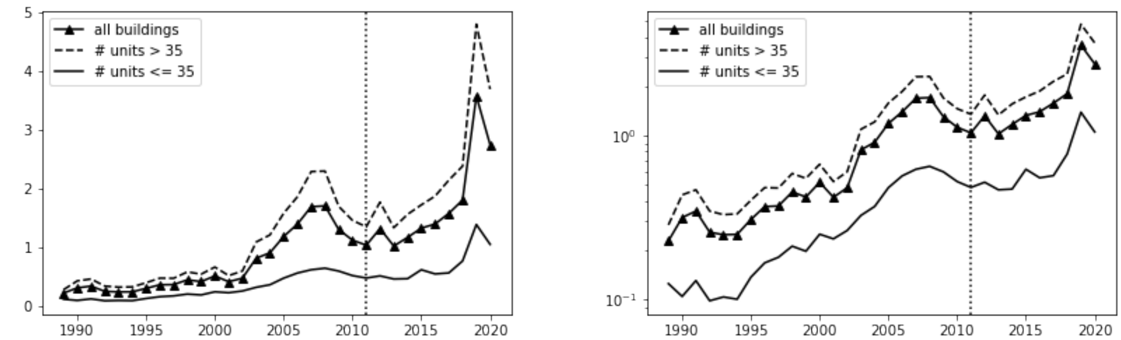


(a) Average



(b) Log Average

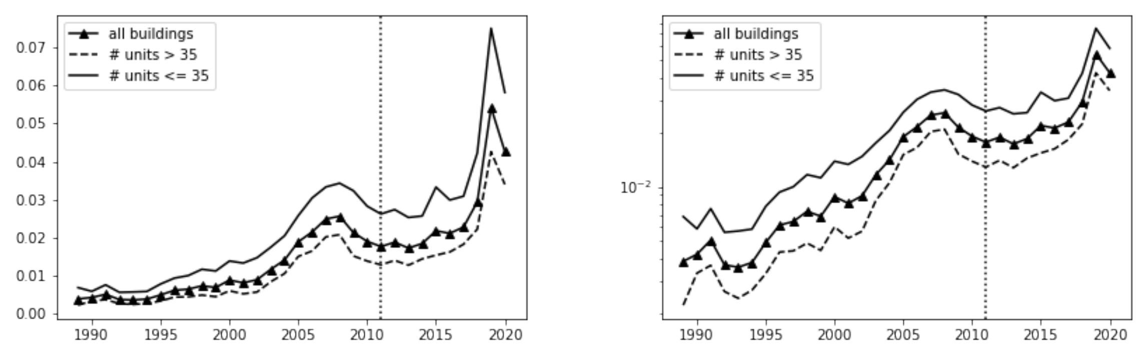
Figure 3: Average and log average number of Maintenance Complaints per year per unit from 2004 to 2020 (weighted by total number of units in each building)



(a) Average

(b) Log Average

Figure 4: Average and log average number of Overall Complaints per year per building from 1989 to 2020 (weighted by total number of units in each building)



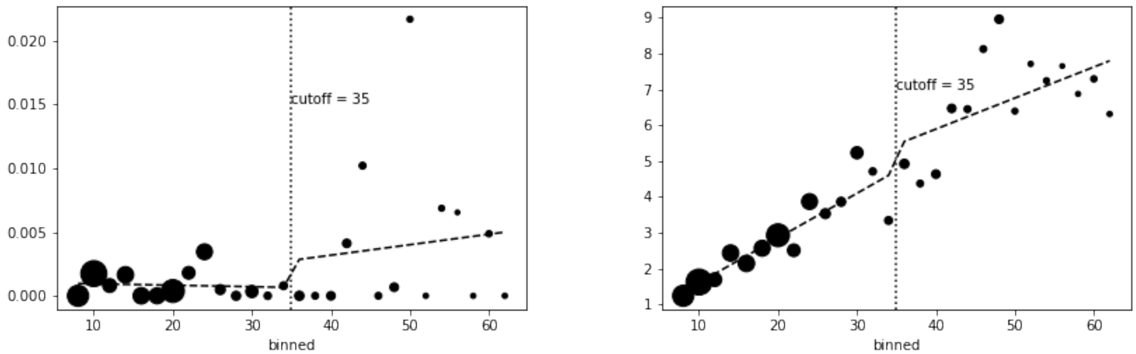
(a) Average

(b) Log Average

Figure 5: Average and log average number of Overall Complaints per year per unit from 1989 to 2020 (weighted by total number of units in each building)

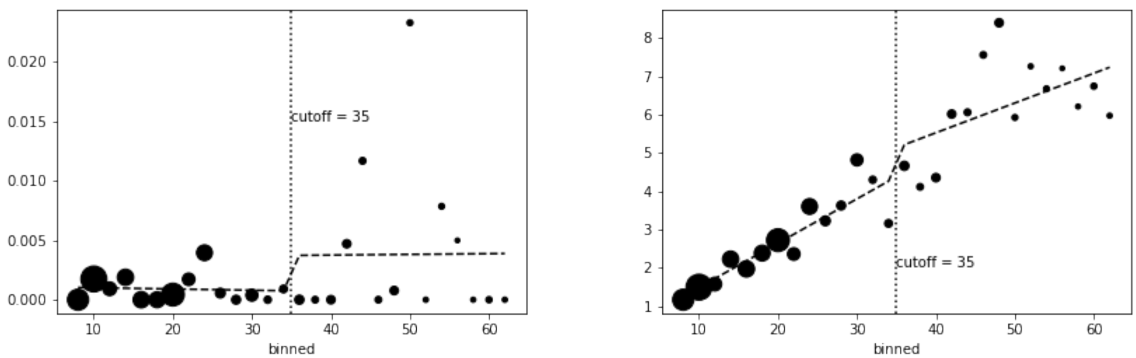
The Rent Act of 2011 was passed and signed on June 24, 2011. However, the specific amendment on home improvements came into effect on September 24, 2011. For identification purposes, we need to consider when the effects of such a law change would show up in the data. In the following analysis, I consider the number of complaints per year as the measure of housing quality, and I consider two different cases: people react to the policy change some time after the policy comes into effect; and people react to the policy change once they know about the future change, even before it come into effect. In the first case, I compute the number of complaints each building receives within every natural year. That is, I assume there would be a lag, and the effects would show up in the data since the year 2012. In the second case, I use June 24 as the start of a year-long period and compute the number of complaints of each building within each of these periods. That is, people react immediately when they know about the future change on June 24, 2011.

The 35 cut-off specified in the Rent Act of 2011 also encourages us to consider a sharp regression discontinuity design. Although buildings of different sizes may be managed differently, it is reasonable to assume that buildings whose number of units are around the cut-off are not significantly different in that respect. For each building, I compute the average number of complaints per year before and after 2011 or before and after the policy was announced. We can see from Figure 6 to 9 that discontinuities around the cut-off exist both before and after the time cut-off. However, it seems that the level of discontinuity changes after 2011. As discussed before, here I considered two possible cases: In Figure 6 and 8, I compute the number of complaints each building receives within every natural year. In Figure 7 and 9, I use June 24 as the start of a year-long period and compute the number of complaints of each building within each of these periods.



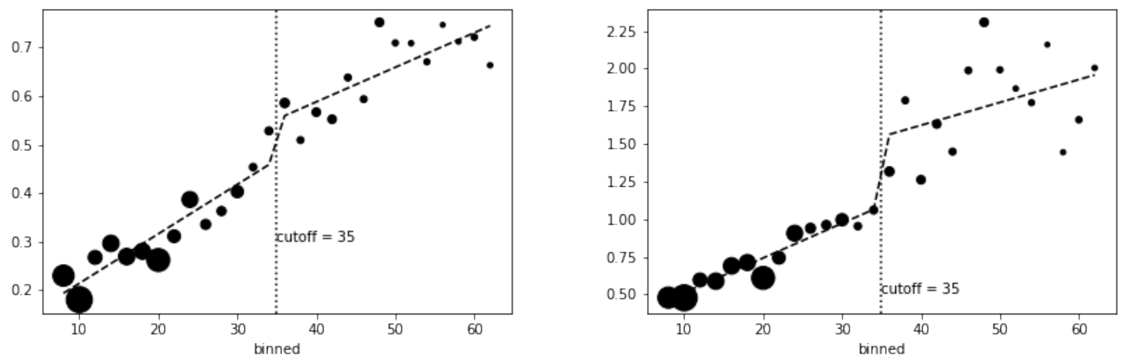
(a) Before 2011 **(b)** After 2011

Figure 6: Scatter plot of average number of Maintenance Complaints per year before and after 2011 (natural year, bin size = 2)



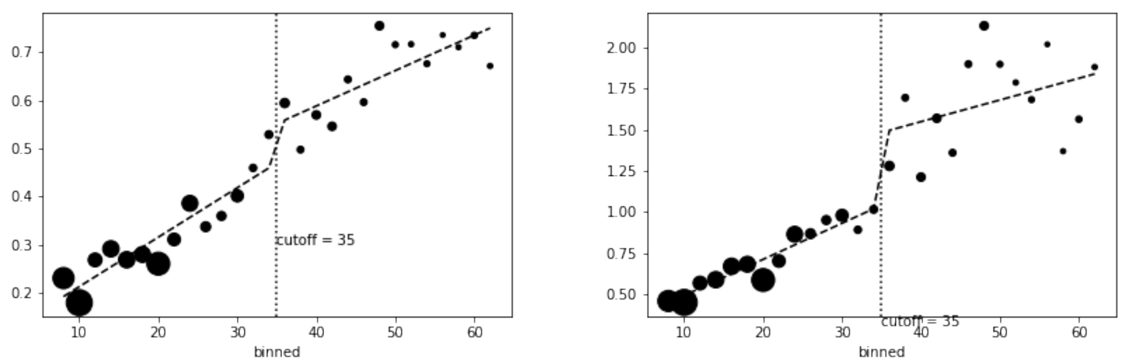
(a) Before June 24, 2011 **(b)** After June 24, 2011

Figure 7: Scatter plot of average number of Maintenance Complaints per year before and after June 24, 2011 (people react immediately when the law change was passed, bin size = 2)



(a) Before 2011 **(b)** After 2011

Figure 8: Scatter plot of average number of Overall Complaints per year before and after 2011 (natural year, bin size = 2)



(a) Before June 24, 2011 **(b)** After June 24, 2011

Figure 9: Scatter plot of average number of Overall Complaints per year before and after June 24, 2011 (people react immediately when the law change was passed, bin size = 2)

All these exploratory analyses lead us to consider the following regression to check whether buildings whose number of units are slightly above the 35 cut-off are significantly different from those with slightly less than 35 units after the law change come into effect:

$$Y_{it} = \beta_0 + \beta_1 S_i + \beta_2 T_{it} + \beta_3 S_i T_{it} + \beta_4 \hat{N}_i + \beta_5 A_{it} + \epsilon_{it}$$

where N_i is the total number of units of a building; $S_i = \mathbf{1}_{\{N_i > 35\}}$; $T_{it} = \mathbf{1}_{\{t > \text{change date}\}}$; $\hat{N}_i = N_i - 35$; and A_{it} is the age of the building.

5 Results

As discussed in Section 3, we expect to see increases in the number of complaints received about buildings with more than 35 units. Table 6 and Table 7 presents the results that confirm this expectation.

Here, h represents the distance between the number of units of the buildings from the cut-off. For example, when $h = 2$, we select buildings with 33 to 37 units and investigate the effects of the policy. As shown in Table 6, when $h = 1$, having more or less than 35 units (S_i) and how different from this cut-off ($\hat{N}_i$) do not have a significant effect on the number of Maintenance Complaints. In the meantime, buildings generally have more Maintenance Complaints after 2011. In particular, buildings with more than 35 units (treatment group) have significantly more Maintenance Complaints after 2011 (coefficient is 1.066 and significant at 5% level). The age of the buildings generally has an insignificant or small impact on the number of Maintenance Complaints. Intuitively, it is possible that older buildings tend to have more complaints, but our results here show the contrary.

If we look at the results for Overall Complaints in Table 7, when $h = 2$, having more or less than 35 units (S_i) and how different from this cut-off ($\hat{N}_i$) do not have a significant effect on the number of Overall Complaints. In the meantime, buildings generally have more Overall Complaints after 2011. In particular, buildings with more than 35 units have significantly more Overall Complaints after 2011 (coefficient is 0.219 and significant at 5% level). The age of the buildings has a significant but small impact on the number of complaints.

Table 6: Regression without fixed effects: number of Maintenance Complaints per year from 2004 to 2020 (natural year)

	h = 1	h = 2	h = 3
S_i	-0.361	-0.579	0.593
	(0.526)	(0.407)	(0.413)
T_{it}	3.379^{**}	3.320^{**}	4.346^{**}
	(0.303)	(0.274)	(0.279)
S_iT_{it}	1.066^{*}	1.619^{**}	0.856^{*}
	(0.437)	(0.375)	(0.394)
$\hat{N}_i$	0.253	$0.263^{\dagger}$	-0.211^{*}
	(0.306)	(0.139)	(0.095)
A_{it}	-0.005	-0.003	-0.043^{**}
	(0.008)	(0.007)	(0.007)
R^2	0.061	0.066	0.053
N (# buildings)	294	436	574

Note: h represents maximum distance from the cut-off. I have also tested higher values of h and found that the distance from the 35 cut-off would become a significant factor if h continues increasing (Appendix, Table 14).
Standard errors are in parentheses.
†: Significance levels, two-tailed test: 10%.
∗: Significance levels, two-tailed test: 5%.
∗∗: Significance levels, two-tailed test: 1%.

Table 7: Regression without fixed effects: number of Overall Complaints per year from 1989 to 2020 (natural year)

	h = 1	h = 2	h = 3
S_i	0.159	0.072	−0.043
	(0.115)	(0.078)	(0.071)
T_{it}	0.359**	0.348**	0.376**
	(0.081)	(0.066)	(0.061)
S_iT_{it}	0.075	0.219*	0.365**
	(0.113)	(0.087)	(0.083)
$\hat{N}_i$	−0.025	0.005	0.050**
	(0.071)	(0.029)	(0.018)
A_{it}	0.011**	0.010**	0.009**
	(0.002)	(0.001)	(0.001)
R^2	0.015	0.019	0.021
N (# buildings)	294	436	574

Note: h represents maximum distance from the cut-off. I have also tested higher values of h and found that the distance from the 35 cut-off would become a significant factor if h continues increasing (Appendix, Table 15).
Standard errors are in parentheses.
†: Significance levels, two-tailed test: 10%.
∗: Significance levels, two-tailed test: 5%.
∗∗: Significance levels, two-tailed test: 1%.

To some extent, filing complaints is a relatively subjective decision. It is possible that tenants who live in certain buildings or areas are less willing to file complaints. For example, if a building always has poor services, tenants in that building may be more used to the status quo and are less likely to file complaints. We further investigate this by varying the dummy variables included in the regression. We first look at the results for Maintenance Complaints. As shown in Table 8, the inclusion of building or block dummy variables does not affect the key estimates, the coefficient for S_iT_{it}. In all three columns, the coefficient of interest remains around 1.619 and statistically significant at 1% level. So buildings slightly above the 35 cut-off have more Maintenance Complaints than buildings slightly below the cut-off even when we control for the building or block fixed effects. Similarly, if we look at the results for Overall Complaints in Table 9, the inclusion of building or block dummy variables again does not affect the key estimates. In this case, the coefficient of interest remains around 0.219 and statistically significant at 5% level.

I obtain similar results when I compute the number of complaints per year slightly differently. That is, I use June 24 as the start of a year-long period and compute the number of complaints of each building within each of these periods. In this case, people react immediately when they see this law change has been passed, even before the policy comes into effect. As shown in Table 10, with or without building or block fixed effects, the coefficient of interest remains around 1.603 and statistically significant at 1% level. So buildings slightly above the 35 cut-off still have more Maintenance Complaints than buildings slightly below the cut-off. If we look at the results for Overall Complaints in Table 11, the coefficient of interest remains around 0.226 and statistically significant at 1% level. So building slightly above the 35 cut-off again have more Overall Complaints than buildings slightly below the cut-off.

Table 8: Regression with fixed effects: number of Maintenance Complaints per year from 2004-2020 (natural year)

h = 2	(1)	(2)	(3)
S_i	-0.579	-1.665^{*}	-1.610
	(0.407)	(0.766)	(3.022)
T_{it}	3.320^{**}	2.943^{**}	-0.186
	(0.274)	(0.283)	(0.383)
$S_i T_{it}$	1.619^{**}	1.619^{**}	1.619^{**}
	(0.375)	(0.352)	(0.342)
$\hat{N}_i$	0.263	1.126^{**}	0.813
	(0.139)	(0.301)	(0.896)
A_{it}	-0.003	0.041^{**}	0.409^{**}
	(0.007)	(0.015)	(0.035)
Building Dummies Included	No	No	Yes
Block Dummies Included	No	Yes	No
R^2	0.066	0.209	0.268
N (# buildings)	436	436	436

Note: h represents distance from the cut-off.
Standard errors are in parentheses.
$*$: Significance levels, two-tailed test: 5%.
$**$: Significance levels, two-tailed test: 1%.

Table 9: Regression with fixed effects: number of Overall Complaints per year from 1989-2020 (natural year)

h = 2	(1)	(2)	(3)
S_i	0.072	-0.220	0.486
	(0.078)	(0.160)	(0.655)
T_{it}	0.348**	0.015	-0.413**
	(0.066)	(0.071)	(0.078)
$S_i T_{it}$	0.219*	0.219**	0.219**
	(0.087)	(0.083)	(0.082)
$\hat{N}_i$	0.005	0.101	-0.089
	(0.029)	(0.064)	(0.194)
A_{it}	0.010**	0.031**	0.058**
	(0.001)	(0.002)	(0.003)
Building Dummies Included	No	No	Yes
Block Dummies Included	No	Yes	No
R^2	0.019	0.125	0.151
N (# buildings)	1124	1124	1124

Note: h represents distance from the cut-off.
Standard errors are in parentheses.
$*$: Significance levels, two-tailed test: 5%.
$**$: Significance levels, two-tailed test: 1%.

Table 10: Regression with fixed effects: number of Maintenance Complaints per year (people react immediately when the law change was passed on June 24)

h = 2	(1)	(2)	(3)
S_i	-0.664	-1.927^{*}	-1.620
	(0.468)	(0.883)	(3.476)
T_{it}	3.059∗∗	2.553^{**}	-1.514^{**}
	(0.311)	(0.323)	(0.437)
$S_i T_{it}$	1.603^{**}	1.603^{**}	1.603^{**}
	(0.427)	(0.407)	(0.395)
$\hat{N}_i$	0.304	1.196^{**}	0.926
	(0.157)	(0.346)	(1.030)
A_{it}	-0.001	0.062^{**}	0.570^{**}
	(0.008)	(0.018)	(0.042)
Building Dummies Included	No	No	Yes
Block Dummies Included	No	Yes	No
R^2	0.050	0.175	0.235
N (# buildings)	436	436	436

Note: h represents distance from the cut-off.
Standard errors are in parentheses.
∗: Significance levels, two-tailed test: 5%.
∗∗: Significance levels, two-tailed test: 1%.

Table 11: Regression with fixed effects: number of Overall Complaints per year (people react immediately when the law change was passed on June 24)

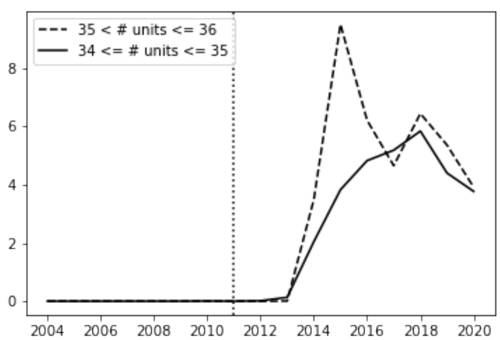
h = 2	(1)	(2)	(3)
S_i	0.068	−0.247	0.457
	(0.079)	(0.161)	(0.659)
T_{it}	0.296**	−0.045	−0.522**
	(0.066)	(0.071)	(0.078)
$S_i T_{it}$	0.226**	0.226**	0.226**
	(0.087)	(0.083)	(0.082)
$\hat{N}_i$	0.010	0.105	−0.073
	(0.029)	(0.065)	(0.196)
A_{it}	0.010**	0.032**	0.063**
	(0.001)	(0.002)	(0.003)
Building Dummies Included	No	No	Yes
Block Dummies Included	No	Yes	No
R^2	0.018	0.126	0.155
N (# buildings)	436	436	436

Note: h represents distance from the cut-off.
Standard errors are in parentheses.
∗: Significance levels, two-tailed test: 5%.
∗∗: Significance levels, two-tailed test: 1%.

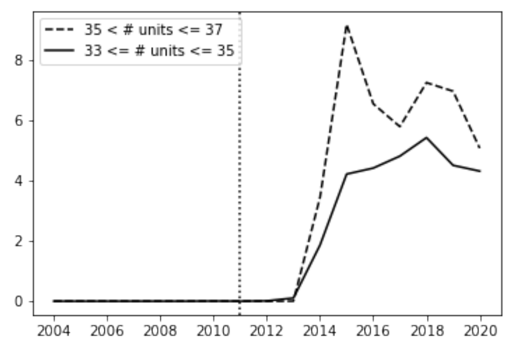
Robustness Checks

Common Pre-trend Assumption

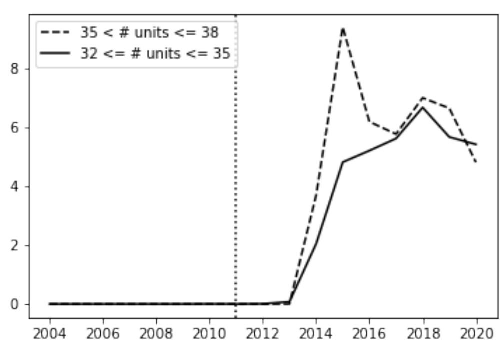
The key assumption of Difference-in-Differences analysis is the common or parallel pre-trend assumption. Figure 2 - 5 provide us with some graphic evidence that before the law change came into effect in 2011, there exist some common trends between the two groups of buildings, buildings with 35 or more units and buildings with less than 35 units. We can also look at the trends of smaller subsets of the buildings, categorized by the distance between the number of units of each building from the 35 cut-off (h). In Figure 10, we see that buildings just above or below the 35 cut-off have very few complaints before 2011. This provides some evidence that these two groups have similar trends before the law change. Figure 11 presents the trends for the Overall Complaints. While the overall trends are similar for both groups, it is difficult to say whether such trends the parallel.



(a) $h = 1$

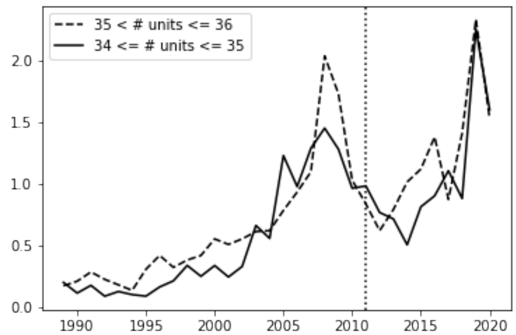


(b) $h = 2$

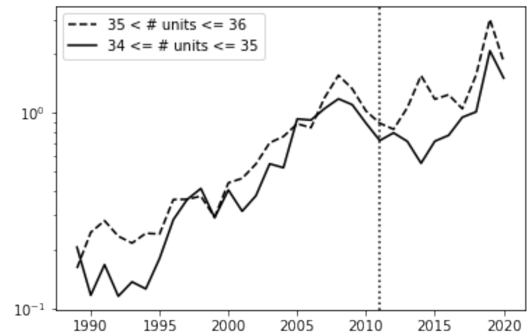


(c) $h = 3$

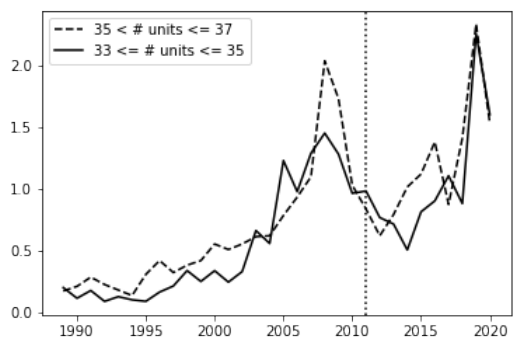
Figure 10: Average number of Maintenance Complaints per year per building from 2004 to 2020 (weighted by total number of units in each building)



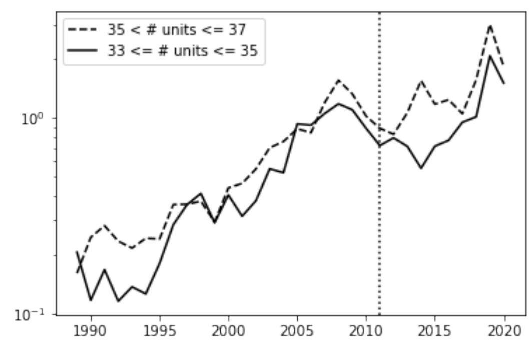
(a) $h = 1$: average



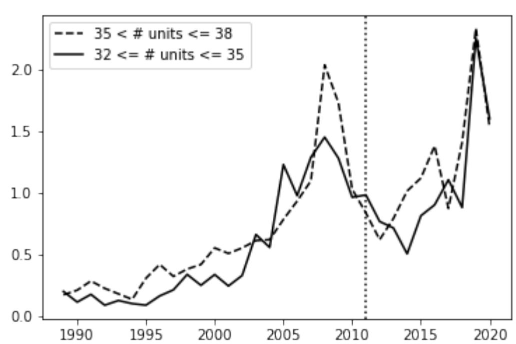
(b) $h = 1$: log average



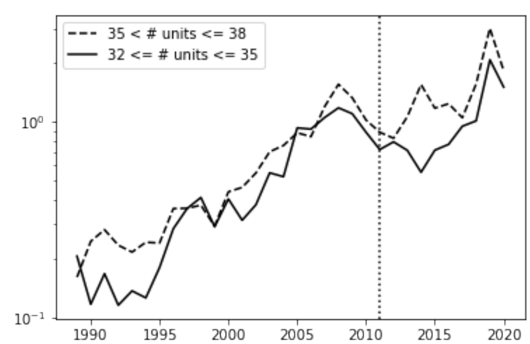
(c) $h = 2$: average



(d) $h = 2$: log Average



(e) $h = 3$: average



(f) $h = 3$: log average

Figure 11: Average number of Overall Complaints per year per building from 1989 to 2020 (weighted by total number of units in each building)

These graphs show that there may exist common or similar trends before the law change came into effect, but the visual evidence is not explicit enough. To partly test or to relax this common trend assumption, I consider the following regression that allows for group-specific linear time trends ($S_i \times t$).

$$Y_{igt} = \beta S_i T_{it} + \delta(S_i \times t) + \alpha_g + \lambda_t + \epsilon_{it}$$

where $S_i = \mathbf{1}_{\{N_i>35\}}$ (N_i is the total number of units of a building); $T_{it} = \mathbf{1}_{\{t>\text{change date}\}}$; α_g and λ_t are group and time dummies. For different values of h, the regression results for Maintenance Complaints are presented in Table 12. We see that there exist no significant group-specific linear time trends. This could be an evidence for the common pre-trend assumption. Similarly, the results for Overall Complaints in Table 13 also show that there are no significant group-specific linear time trends.

Table 12: Checking for common trend assumption in Maintenance Complaints: regression with group-specific linear time trends

	h = 1	h = 2	h = 3
$S_i T_{it}$	1.393	1.029	$1.431^\dagger$
	(0.855)	(0.731)	(0.775)
$S_i \times t$	−0.039	0.069	−0.068
	(0.087)	(0.075)	(0.079)
R^2	0.104	0.112	0.112
N (# buildings)	294	436	574

Note: h represents distance from the cut-off.
Standard errors are in parentheses.
†: Significance levels, two-tailed test: 10%.
∗: Significance levels, two-tailed test: 5%.
∗∗: Significance levels, two-tailed test: 1%.

Table 13: Checking for common trend assumption in Overall Complaints: regression with group-specific linear time trends

	h = 1	h = 2	h = 3
$S_i T_{it}$	0.097	0.273^{*}	$0.244^{\dagger}$
	(0.178)	(0.137)	(0.130)
$S_i \times t$	−0.001	−0.003	0.008
	(0.009)	(0.007)	(0.006)
R^2	0.046	0.049	0.044
N (# buildings)	294	436	574

Note: h represents distance from the cut-off.
Standard errors are in parentheses.
†: Significance levels, two-tailed test: 10%.
∗: Significance levels, two-tailed test: 5%.
∗∗: Significance levels, two-tailed test: 1%.

Stable Composition Assumption

Another assumption behind the analysis is the Stable Composition Assumption, which is to say that there should be no compositional changes after the treatment. In this particular case, buildings are categorized into the treatment and control groups by the number of units they have. After the policy change comes into effect, it is reasonable to believe that there would not be significant compositional changes as the number of units in each building is not likely to change. Even though landlords can redevelop their buildings and change the number of units, this is not likely to occur within a short period of time, especially when the units are occupied by tenants.

Still, it would be valuable to check the history of redevelopments or construction of the rent-stabilized buildings if such data are available. For this study, the number of units of each building is obtained from NYCityMap. We are only able to obtain the current number of units of each building from this source. If we have the history data of the number of units in these buildings, it would be meaningful to investigate whether landlords react to the policy change by redeveloping their properties to increase their profits under rent regulation, which is a phenomenon observed in San Francisco's rent-regulated buildings (Asquith, 2019; Diamond et al., 2019).

6 Discussion

The purpose of rent regulation policy is to provide people with more affordable rental housing choices. Especially in metropolitan areas like New York City, such policies are playing an important role in regulating the city's rental housing market. However, such policies can also have unintended consequences. It is possible that landlords react to specific policies in ways that eventually harm the interest of tenants. In the policy that we study, when rent increase due to home improvements is limited, it is possible that landlords would become more reluctant to provide home improvements services to tenants living in rent-regulated apartments. As discussed in Section 3, all else being equal, we should expect to see more complaints about buildings that are just above the 35 cut-off than those that are just below the 35 cut-off after the law change in 2011.

The results confirm our expectations. As there is no significant evidence for group-specific trends and compositional changes are not likely to occur, we see that buildings with slightly more than 35 units have more Maintenance Complaints and Overall Complaints after the law change took place. This is to say that when the rent stabilization laws specifically reduce the amount of rent increase that can be imposed due to home improvement, this group of buildings impacted are having more problems with their maintenance and also issues with the overall quality.

It is noteworthy that in our analysis, the age of the building has a relatively small or insignificant effect on the maintenance quality or the overall quality of the buildings. This may be different from our intuitive guess that older buildings may have more maintenance-related problems. To some extent, this suggests that the key to good housing quality is not necessarily how old or new the building is. It is how much the landlords are willing to take care of their tenants that determine the level of housing quality.

While the results show that the law change in the Rent Act of 2011 has a negative impact on the housing quality of the associated rent-stabilized buildings in Manhattan, there are several limitations to this study. First, the data used in this study is on the building level rather than the individual unit level. The publicly available data only allows us to identify which buildings have had rent-stabilized units from the lists of rent-stabilized buildings published by the Rent Guidelines Board of NYC Government, which is one of the sources I use to construct the dataset. As stated by the Rent Guidelines Board in the instructions on how to use these lists, the only way to know if an individual apartment is rent-stabilized is to contact the relevant government agency and inquire about that particular unit. Thus, I am not able to obtain data on which individual apartments within these buildings or how many apartments in each of these buildings are rent-stabilized. Even though the Maintenance Complaints datasets have the apartment number for each complaint, I am not able to know whether each of these apartments is rent-stabilized. For future work, we can expect to see more accurate analyses if one has access to individual-apartment-level information.

Another potential limitation comes from the measure of housing quality that this study uses. In this study, I use the number of complaints as the measure of housing quality of rent-stabilized buildings. This measure can only show how "bad" a building is or how much worse it has become. It does not reflect how "good" the building is or how much the building's services and maintenance have improved if there are simply no complaints filed over the years about that building. In the New York City Housing Vacancy Survey, individual units are evaluated by their quality, such as the condition of floors and kitchen facilities functioning. I believe we are able to conduct more in-depth analyses with access to this type of data if we are able to identify individual units across different waves of the survey.

7 Conclusion

This study investigates the effect of rent regulation on the housing quality of rental buildings. More specifically, it answers the question: how does the law change on rent increase due to home improvements in the Rent Act of 2011 affect the housing quality of the rent-stabilized buildings? The Rent Act of 2011 specifies that there would be less rent increase if apartment improvements were made for buildings with 35 or more units. Using a Difference-in-Differences model combined with a Regression Discontinuity approach, my analysis shows that the law change in the Rent Act of 2011 has a negative impact on the maintenance and overall quality of the buildings associated with the law change in Manhattan. While previous literature has not come to an agreement in terms of how rent regulation affects housing quality, this study provides new empirical evidence to the discussion. When the rent regulation policy limits the amount of rent increase due to home improvement, this kind of policy can have an unintended negative impact on the rental housing market and on the tenants whom the policy is supposed to benefit.

More importantly, while previous studies mostly use the standard New York City Housing and Vacancy Survey (NYCHVS) data, the main novelty of this study is the use of new data. Through combing multiple sources of data, including complaints received by the Department of Housing Preservation and Development (HPD) and the Department of Buildings (DOB) about each building and building information scraped from NYC public databases, I am able to construct a novel longitudinal dataset with identifiable information of each building and the number of complaints each building receives as a measure of housing quality. Even though there still exists limitations in terms of data availability, the use of new public data in this study could shed some light on the value of discovering new data sources to solve existing research questions.

Despite its limitations, this study provides us with some directions for future research. First, future studies could focus on the individual-unit level effect of the rent regulation policy. This study investigates the building-level effect of the law change due to the limitation of individual-apartment-level data. I believe that if we have more individual-apartment-level information, including the rent stabilization status of the apartment and some assessment of its condition, we would be able to obtain more thorough and accurate analyses of the impact of the policy. Second, as some previous studies on rent regulation show that landlords may react to the policy by redeveloping their properties to be exempt from rent regulation in the context of San Francisco (Asquith, 2019; Diamond et al., 2019), it would be intriguing to know if this is also the case for New York City. If data on the history of developments of properties are available, we should be able to conduct similar analyses to investigate this question. Another possible direction for future work is to look at the interaction between landlords and tenants. For example, how do landlords react to the complaints filed by the tenants? Does this complaint filing system effectively improve the level of maintenance that landlords provide? There are many valuable questions that we can answer with more data available.

Rent regulation has been an important housing policy in New York City. While the purpose of this study is not to criticize or deny the effectiveness of such policies in making housing more affordable, the unexpected negative impact on housing quality should be taken into account in future studies and policy makings.

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Appendix

Table 14: Regression without fixed effects: number of Maintenance Complaints per year from 2004-2020 (natural year, larger values of h)

	h = 5	h = 15	h = 25	No restrictions on h
S_i	0.964^{**}	-1.729^{**}	-1.956^{**}	-0.255^{**}
	(0.309)	(0.173)	(0.114)	(0.084)
T_{it}	4.726^{**}	3.394^{**}	2.563^{**}	2.177^{**}
	(0.179)	(0.079)	(0.047)	(0.055)
S_iT_{it}	-0.019	2.763^{**}	3.831^{**}	4.498^{**}
	(0.276)	(0.151)	(0.108)	(0.107)
$\hat{N}_i$	-0.161^{**}	0.100^{**}	0.076^{**}	0.009^{**}
	(0.039)	(0.007)	(0.003)	(0.000)
A_{it}	-0.005	0.011^{**}	0.012^{**}	0.025^{**}
	(0.005)	(0.003)	(0.002)	(0.002)
R^2	0.060	0.058	0.032	0.048
N (# buildings)	1124	4731	9335	12406

Note: h represents distance from the cut-off.
Standard errors are in parentheses.
$*$: Significance levels, two-tailed test: 5%.
$**$: Significance levels, two-tailed test: 1%.

Table 15: Regression without fixed effects: number of Overall Complaints per year from 1989-2020 (natural year, larger values of h)

	h = 5	h = 15	h = 25	No restrictions on h
S_i	0.084	-0.125^{**}	-0.022	0.537^{**}
	(0.054)	(0.027)	(0.019)	(0.011)
T_{it}	0.403^{**}	0.301^{**}	0.251^{**}	0.264^{**}
	(0.039)	(0.015)	(0.010)	(0.010)
S_iT_{it}	0.281^{**}	0.604^{**}	0.664^{**}	0.835^{**}
	(0.058)	(0.028)	(0.022)	(0.018)
$\hat{N}_i$	0.008	0.026^{**}	0.017^{**}	0.001^{**}
	(0.007)	(0.001)	(0.001)	(0.000)
A_{it}	0.010^{**}	0.010^{**}	0.009^{**}	0.007^{**}
	(0.001)	(0.000)	(0.000)	(0.000)
R^2	0.021	0.033	0.032	0.039
N (# buildings)	1124	4731	9335	12406

Note: h represents distance from the cut-off.
Standard errors are in parentheses.
∗: Significance levels, two-tailed test: 5%.
∗∗: Significance levels, two-tailed test: 1%.