The Effects of Inclusionary Zoning on New Housing Construction in Pittsburgh

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Abstract

The City of Pittsburgh is in the midst of a housing crisis. To address the housing crisis, Pittsburgh has proposed expanding its Inclusionary Zoning ('IZ') overlay citywide. This overlay was initially implemented in 2019 in Lawrenceville, in 2021 in Polish Hill and Bloomfield, and in 2022 in Oakland, and mandates that 10% of units in projects of 20 units or more be rented or sold as Affordable Housing. Critics of this policy argue that as it is a mandate without sufficient offsetting subsidies, the overlay acts as a tax on new development, which constrains the housing supply and drives rents up further. Using a difference-in-differences approach on building permit data in Lawrenceville, the Strip District, and South Side Flats from 2012 to the present day, we find that following the implementation of IZ, the rate of new housing construction in Lawrenceville decreased by 32%, while the rate of new housing construction in the Strip District and South Side Flats, where IZ was not implemented, increased by 36% and 18%, respectively.

Keywords: Housing Affordability, Inclusionary Zoning, Urban Economics

JEL Codes: R31, R38, R21, R23

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1 Introduction

For the past several decades, Pittsburgh has had a reputation of population collapse and general housing affordability. However, since the Great Recession in 2009, the population decline has stopped and housing prices have doubled, far outpacing inflation (which has been 45% over the same period). Like many cities throughout the U.S., Pittsburgh is now wrestling with a housing shortage[1] and decline in overall housing affordability.

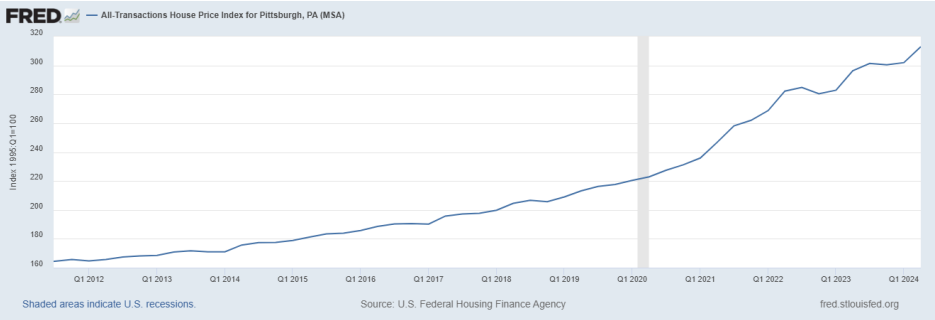

Figure 1: Housing Price Index of Pittsburgh 2012-2024 (Source: U.S. Federal Housing Finance Agency, Federal Reserve Bank of St. Louis.)

One policy that the City of Pittsburgh has experimented with is Inclusionary Zoning (IZ). Inclusionary Zoning policies can take different forms, but they generally require private developments to include some percentage of deed-restricted Affordable Housing in order to receive entitlements to build. These policies vary widely in terms of exact implementation. In Pittsburgh, this policy takes the form of a mandate where buildings of 20 units or more must set aside 10% of their units as deed-restricted Affordable Housing.

IZ policies have been attempted in various other localities across the country. Cities like Seattle[2], Portland[3], New York, Los Angeles[4] and many others have explored these policies,

[1]The "Pittsburgh Housing Needs Assessment", 2022, pg 106 notes a shortage of 8,200 units for low-income households and 16,000 for moderate-income households

[2]Wang and Krimmel, 2024 performed a study of how Seattle's Inclusionary Zoning mandate affected housing production in the affected neighborhoods and adjacent neighborhoods.

[3]Kowta and Fairris, 2023 Portland did a deep investigation commissioned by the city of Portland on their failed Inclusionary Zoning policy, and made recommendations for changes to align the policy more closely with achieving their desired outcomes.

[4]Phillips, 2024 completed modeling of how Inclusionary Zoning policies in Los Angeles effect the total number of units built across various affordability requirements.

and have generally failed in their promise to deliver housing affordability.

1.1 Summary of Findings

Since Inclusionary Zoning was implemented in Lawrenceville, the construction rate of units per year in buildings of 20+ units declined by roughly 32%. Concurrently, construction rates in two similar neighborhoods that did not have IZ - the Strip District, and the South Side Flats - grew by 36% and 18%, respectively.

While these results are not statistically significant due to the small sample size, they do match or exceed what we would expect based on economic theory. Theory and data align here - IZ, as currently implemented in Pittsburgh, constrains housing supply in neighborhoods where it was implemented when compared with neighborhoods where it was not implemented.

2 Institutional Background

Following the exploration of housing conditions in Pittsburgh and the issuance of Pittsburgh's Housing Needs Assessment in 2016[5], the task force who created this assessment recommended certain strategies for improving housing affordability in Pittsburgh. Key among the findings were that there was a significant shortage of units for lower-income households - specifically those making less than 50% of AMI.

In order to correct this shortage, one of the strategies recommended by the assessment, and backed by local community organizations, was the implementation of inclusionary zoning to improve affordability and reduce displacement. At the time, many localities were implementing similar policies, and there was minimal study of the effectiveness of the policy[6]

In February 2019, legislation was introduced by Councilwoman Deb Gross creating a

[5] "Pittsburgh Housing Needs Assessment", 2016

[6] Schuetz et al., 2011 performed one of the earlier explorations of Inclusionary Zoning policies, published nearly a decade before Pittsburgh's first implementation. This study found that IZ policies reduced production and increased housing prices.

new inclusionary zoning overlay[7]. This overlay required all buildings of 20-units or more in the Lawrenceville[8] neighborhood of Pittsburgh to reserve 10% of their units for Affordable Housing.

This legislation requires the following of Affordable Housing units:

- **For-Rent** - monthly rent can be no more than 30% of monthly income for households earning no more than 50% percent of "Area Median Income" (AMI)[9]
  - Qualified renters must have an income of no-more than 50% AMI
  - Tenants must be re-qualified yearly based on annual income, and if their income exceeds 80% AMI they must vacate the unit
- **For-Sale** - the initial sale can be no more than 28% of monthly income on housing costs assuming a 30-year mortgage with 5% down for a household earning 70% of AMI.. Eligible households can make no more than 80% of AMI if purchasing.

In order to attempt to offset some of the lost revenue of providing the affordable units, Pittsburgh also implemented a tax abatement using the Local Economic Revitalization Tax Assistance ('LERTA') program of up to $250K per year[10] for up to 10-years for developers providing the mandated affordability. This same abatement is also available to developers outside of the overlay who voluntarily provide affordable units.

The overlay was subsequently extended to two other neighborhoods in Councilwoman Gross's district, Bloomfield and Polish Hill, in July 2021[11]. And again, subsequently, into the Oakland neighborhood[12] of Pittsburgh in April of 2022[13].

[7] 907.04 in the Pittsburgh Zoning Ordinance

[8] When referring to 'Lawrenceville', we are referring to the combined neighborhood consisting of Lower Lawrenceville, Central Lawrenceville, and Upper Lawrenceville

[9] HUD publishes income thresholds for MSAs on an annual basis here

[10] This has a net present value (NPV) of $1.75M at 7% interest if the maximum abatement is claimed

[11] Since 2012, 3 buildings of 20 units or more containing 677 housing units have been completed in Polish Hill and Bloomfield. Since IZ went into effect in Polish Hill and Bloomfield on July 13, 2021, no buildings of 20 units or more have been completed.

[12] When referring to 'Oakland', we are referring to the combined neighborhood consisting of North Oakland, South Oakland, West Oakland, and Central Oakland.

[13] Since 2012, 8 buildings of 20 units or more containing 1,655 housing units have been completed in Oakland. Since IZ went into effect in Oakland, no buildings of 20 units or more have been completed.

In October of 2023, the Builders Association of Metropolitan Pittsburgh ('BAMP') filed a lawsuit against the City of Pittsburgh challenging the IZ mandate (Kraus, 2023). In the complaint, BAMP alleges that the IZ mandate improperly shifts the burden of a public function from the general population to private developers, and amounts to an unconstitutional taking under the Fifth Amendment of the US Constitution. This case is still in litigation and has not been resolved as of November of 2024.

In September 2024, a new proposal was made by Mayor Ed Gainey to extend this overlay citywide, thereby subjecting all development in the city of Pittsburgh to the affordability standards required in Lawrenceville, Bloomfield, Polish Hill, and Oakland (Maruca, 2024).

2.1 Public Comments by Local Leaders

> Councilwoman Deb Gross called inclusionary zoning a "critically important piece of the puzzle" to combat "runaway development." (Murray, 2019)

> Councilwoman Deb Gross, at a Press Conference outside of Pittsburgh City Council, said "As you know, in Lawrenceville, there are many buildings going up that are entirely luxury market rate rents,"(Murray, 2019)

> Mayor Ed Gainey, at the press conference announcing the expansion of IZ, said "We are in the midst of an affordable housing crisis, a crisis that has been coming for decades. In order for us to develop a city that reflects the diversity of our residents, it is necessary to have a diverse, diversified supply of housing." (Maruca, 2024)

> Alex Wallach-Hanson, executive director of advocacy group Pittsburgh United, said his organization was "particularly excited to see the expansion of inclusionary zoning...to make sure that people have the ability to live in safe, affordable, walkable neighborhoods across the whole city." (Maruca, 2024)

> Councilwoman Deb Gross, at a Post Agenda at Pittsburgh City Council, stated that "in the City of Pittsburgh, just since 2020, there has been more housing built inside the IZ overlay proportionally than outside of it." ("Pittsburgh City Council Post-Agenda - 3/14/24", 2024, timestamp 1:55:03)[14]

[14]This claim runs counter to the data and observations of this study - see tables 4 and 2

3 Theory

IZ advocates have a laudable goal of increasing the number of affordable homes available to people with low income. They hope that by mandating affordable units in new developments, they will achieve this goal. Paradoxically, Pittsburgh's IZ policy may have the opposite effect: decreasing housing affordability by constraining housing supply.

3.1 The Math Behind Inclusionary Zoning

Housing prices are determined by local supply and demand. If demand increases in a neighborhood, and supply does not expand as quickly, then prices will rise. Similarly, expanding supply faster than demand lowers prices.

For every 100 new market rate units that get built, 17 to 40 bottom-quintile income units become available within 3 years (Mast, 2023). As people move into new market rate units, they leave their former units vacant, allowing other people to move into their now vacant units, leaving still their own units vacant in turn, and so forth. We can think of these as "moving chains", with each step in the chain a household moving from one unit to the next. These chains move rapidly - six steps in six months to four years. This effect is known as "filtering", which describes the chains of moves that result from higher-rent units being built while creating vacancies for lower-rent units.

Additionally, research has shown that every new large building decreases nearby rents by 6%, relative to that building not being built (Asquith et al., 2023). This is the result of the "filtering" described above.

Mandating that a developer set aside 10% of a new building of 20 units or more to rent at a quarter to a half of market rate is effectively reducing that building's revenue by 5%-7%. This reduction in revenue thereby makes the building less financially viable, and as a result it will cause marginal buildings to not get built. This process is well described by researcher Shane Phillips in a recent episode of UCLA Housing Voice (Phillips and Lens,

2024, 52:20). Securing financing for new construction depends on the expected revenue of that project, with the exception of limited grants given to build affordable housing. If the expected revenue of a project falls low enough that the project cannot secure financing, it will not be built.

New housing supply in Pittsburgh is already fairly inelastic. There are significant restrictions on building new housing, so changes in revenue have relatively small effect on the total amount built, because the total amount built is already so low - the only buildings currently being built are the most financially viable buildings. However, if we estimate a 1.75-2.5 housing supply elasticity in Pittsburgh (Saiz, 2010; Baum-Snow and Han, 2024; Aastveit et al., 2020), then a 5%-7% decrease in revenue means a 8.75% to 16.75% reduction in new housing supply among buildings of 20 units or more.

Since appx. 90% of new housing built in Pittsburgh is in buildings of 20 units or more, that equates to approximately a 7% to 16% drop in new housing supply.

This reduction in construction constrains the housing supply, which pushes rents up for everyone. Because the people who would live in a hypothetical new building that is not built still demand housing, they're forced to compete with other people for housing in nearby buildings. Anyone they outbid for housing is now competing with other people for housing as well. You can follow this same chain all the way to the bottom-quintile renters, who will find housing more scarce and more expensive, and will be therefore more likely to experience displacement, housing insecurity, homelessness, or other negative outcomes.

3.2 Lawrenceville - An Example

In Lawrenceville, 378 new units in buildings of 20 units or more were built between the start of IZ in February 2019 and completed by November, 2024.

35 of those units were the Sixth Ward Flats, a 100% affordable housing Low-Income Housing Tax Credit (LIHTC) project. This project is unaffected by the IZ mandate, which targets market-rate buildings, and would have been built regardless of the mandate. The

other 343 were Arsenal 201 Phase II[15], with 35 units set aside as affordable because of IZ.

If IZ constrains housing supply by 9-17%, then Lawrenceville would have built between 414 and 465 units during that time, a loss of between 36 and 87 market rate units. Which implies a further loss of between 14 and 35 units available to the bottom quintile of renters income units. It also implies median rents in Lawrenceville are approximately 3% to 6% higher now than they would be if IZ was not implemented.

4 Data and Methodology

We collected data on zoning applications, building permits, and occupancy permits on all buildings of 20 units or more built within the Pittsburgh city limits since 2012. This data was collected from City of Pittsburgh's public databases of permits, archived by the Western Pennsylvania Regional Data Center.[16]. We have made the results of our data collection available in a public repository[17] Buildings were considered "complete" when a Certificate of Occupancy was issued by the city. To double check our results, we looked up each building of 20 units or more on Agency Counter[18] to confirm the beginning and end dates of the project. We further looked up the floorplans of each building, when publicly available, to confirm that the number of units in the Certificate of Occupancy matched the number of units in the building.

We considered a building to be subject to the IZ ordinance based on the dates for a completed Zoning application[19].

We only counted market-rate buildings with 20 or more units, because those buildings would be the only ones subject to the IZ ordinance. Dormitories and hotels are excluded, as they are not subject to the IZ ordinance.

[15] As the name "Phase II" implies, this project was already envisioned before IZ was implemented

[16] https://data.wprdc.org/dataset/pli-permits

[17] "Data Repository - The Effects of Inclusionary Zoning on New Housing Construction in Pittsburgh", 2024.

[18] https://pittsburghpa.agencycounter.com

[19] We defined a Zoning application as complete based on the dates that Agency Counter indicated "Zoning Review Accepted" and "Zoning Review Approved."

This analysis is limited by small size of dataset, as only 109 buildings of 20 units or more were completed citywide between January 2012 and November 2024.

4.1 Notes on IZ Applicability

In Pittsburgh, zoning rules de facto go into effect when they are pending in front of council, not upon approval/signing into law. This happens due to the Record of Zoning Approval section of the zoning code[20], which requires that the zoning administrator not take action on any zoning case if the proposed development would be forbidden under the new rules.

Once IZ is introduced with notice at the Planning Commission ('PC') or introduced in council, it becomes a "Pending Ordinance".

If there is a completed application before this notice and introduction of IZ, that application would not be subject to the pending ordinance. This depends on the date that a Zoning Administrator determines an application is complete. When a Zoning Administrator determines an application is complete is not publicly posted. For this report, we have used the status of "Zoning Review Accepted" and "Zoning Review Approved" on Agency Counter to determine if an application is complete.

New or incomplete applications from that point on must either (1) comply with the pending ordinance, or (2) be held until the legislative process concludes and the ordinance either passes or fails

The dates we used are as follows:

- Lawrenceville: 2/19/2019 (date of Council introduction)
- Bloomfield and Polish Hill: 7/13/2021 (date of Council introduction)
- Oakland: 4/26/2022 (date of first PC notice)

[20] 922.02.I in the Pittsburgh Zoning Ordinance

4.2 Summary Findings from Neighborhood Data

We observed that, despite having similar levels of housing completes prior to IZ being implemented in February of 2019, there were significant deviations from that baseline following the implementation of IZ. In Lawrenceville, housing completes declined from 692 units and 6 buildings in the Pre-period, to 378 units and 2 buildings in the Post-period. This is a 45% decrease in the number of units in the before vs after.

In the Strip District and the South Side Flats, neither of which have seen IZ implemented, we observe a different result. Units delivered went up from 805 to 879 units in the Strip District, and from 612 to 574 units in the South Side. This is an increase of 9% and a decrease of 6% in total units delivered, respectively.

Table 1: Summary of Neighborhood Data by Pre and Post-Feb 19, 2019

Neighborhood	Pre Units	Pre Projects	Post Units	Post Projects
Lawrenceville	692	6	378	2
Strip District	805	5	879	7
South Side Flats	612	6	574	3

4.3 Neighborhood Housing Completes, By Year

When summarizing data by production of housing units per year, we observe that the data tells a similar story to the total housing production. Since our "before" and "after" periods are different in length, it helps us to understand not just the total units created, but the rate of production per year, which is perhaps more instructive than the gross numbers.

In this case, our "before" period, from January, 2012 through February, 2019 consists of 86-months, whereas the "after" period from March, 2019 through November, 2024 consists of 69-months.

By using these numbers, we calculate that Lawrenceville saw 97 units/year before IZ, and 66 units/year after IZ. This is a decrease of 32% from the pre- to post-IZ time periods.

In the Strip District and South Side Flats, neither of which have had IZ implemented,

housing production in the Strip District was 112 units/year before, and 152 units/year after February 2019. And the South Side Flats was 85 units/year before, and 100 units/year after February 2019. This yields an increase of 36% for the Strip District and 18% for the South Side Flats in the before vs after time periods.

Table 2: Yearly Rates - Neighborhood Data by Pre and Post-Feb 19, 2019

Neighborhood	Pre Units/Year	Post Units/Year	% Change
Lawrenceville	97	66	-32%
Strip District	112	152	36%
South Side Flats	85	100	18%

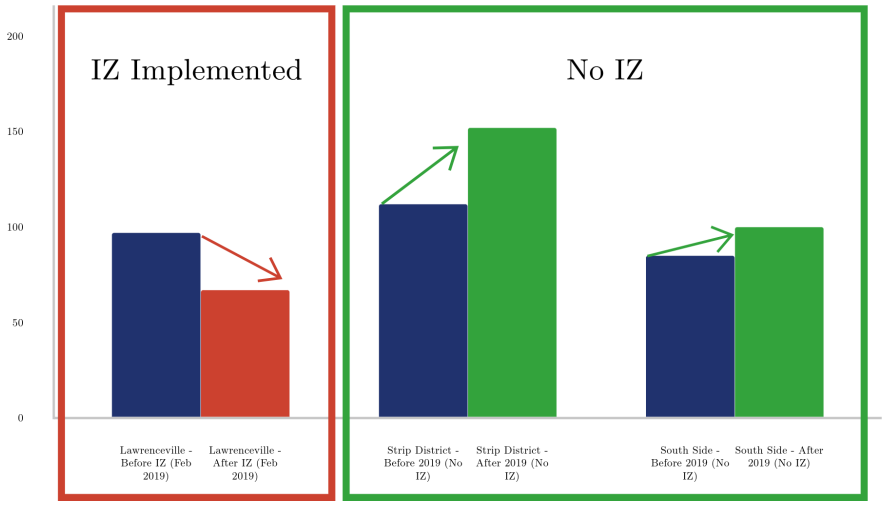

Figure 2: Yearly Housing Completions, Pre and Post Feb 19, 2019 in Subject Neighborhoods

4.4 Notes on Analysis

For our analysis, we compared Lawrenceville with two neighborhoods - The Strip District, and South Side Flats. There are substantial similarities between these neighborhoods, so they provide a good comparison point to Lawrenceville.

- Together, these three neighborhoods account for a significant amount of the total housing built in Pittsburgh since 2012 - over 30% of all new housing units were built in these three neighborhoods

Neighborhood	Land Area (Acres)	RIV Area (Acres)	River Frontage (mi)
Lawrenceville	1156 acres	326 acres	2.6 mi
Strip District	390 acres	178 acres	1.7 mi
South Side Flats	602 acres	164 acres	3.2 mi

Table 3: Neighborhood Land Area and Zoning Comparison

Neighborhood	Total Units Completed (2012-2024)	Units Produced Per Acre	Units Produced Per Acre of RIV Zoning
Lawrenceville	1,070 Units	0.93 Units/Acre	3.3 Units/Acre RIV
Strip District	1,684 Units	4.3 Units/Acre	9.5 Units/Acre RIV
South Side Flats	1,154 Units	2.0 Units/Acre	7.0 Units/Acre RIV

Table 4: Neighborhood Comparison - Rates of Housing Production by Land Area

- The Strip District is directly adjacent to Lawrenceville geographically
- All three neighborhoods have a mix of residential, commercial, and industrial uses
- All three neighborhoods are anchored by a vibrant commercial main street
- All three neighborhoods are riverfront neighborhoods, with all having similar zoning conditions and having substantial portions in the RIV zoning district[21]. See detailed comparison in *Table 3* and *Table 4*
- All three neighborhoods have similar topographic conditions, consisting of relatively flat areas close to the river
- Only two other buildings were completed in neighborhoods anchored by RIV zoning over the 12-year study period - one in South Shore (2020) and one in North Shore (2024). Because of the small sample size, we did not include those neighborhoods in our comparison.

[21] 905.04 in Pittsburgh's zoning ordinance

4.5 Conclusions from Data

Our results align with expectations from other similar empirical studies and economic theory. The IZ mandate acts as a revenue tax on constructing new 20+ unit buildings in Lawrenceville. The decrease in future revenue makes it harder for developers to secure financing for future projects (Phillips and Lens, 2024), resulting in projects simply not being built.

To extrapolate further - if every neighborhood in Pittsburgh had a similar IZ mandate that increased the cost of building, while some developers might find that acceptable, others still would decide to build in other locations where they can achieve acceptable returns. This may include shifting projects from the city proper to any of the other 129 municipalities in Allegheny County, to municipalities outside of Allegheny County, or perhaps more likely, to entirely different metropolitan areas in urban cores that have lower development costs, higher rents, or some combination of the two.

If IZ policies lead to housing production shifting out of Pittsburgh and into other metropolitan areas, the accompanying reduction in housing supply has the potential to drive rent and home price increases, ultimately creating the most harm for the lowest-income renters and buyers.

5 Empirical Results

To measure the effect of the Inclusionary Zoning overlay on the construction of projects of 20 housing units or more in Lawrenceville, we estimate the following difference-in-differences (Cunningham, 2021) regression:

$$Y_{it} = \beta_0 + \beta_1 \text{Treatment} + \beta_2 \text{Post} + \beta_3 (\text{Treatment} \times \text{Post}) + \epsilon_{it}$$

Where: Y_{it} is the outcome (e.g., units or projects, in either pre or post period). Treatment is 1 for Lawrenceville, 0 for Strip District and South Side Flats. Post is 1 for Post-Feb 19, 2019, 0 otherwise. The interaction term (Treatment × Post) captures the treatment effect. The coefficient β_3 on the interaction term gives the DID estimate — the change in the outcome variable attributable to the intervention (the post-period change in Lawrenceville relative to the Strip District and South Side Flats).

Table 5: Difference-in-Differences (DID) Regression Results

	Units	**Projects**
Intercept	708.50**	5.50
	(127.51)	(1.46)
Treatment	-16.50	0.50
	(221.03)	(2.53)
Post	18.00	-0.50
	(180.47)	(2.06)
Treatment × Post	-332.00	-3.50
	(312.579)	(3.57)
Observations	6	6
R-squared	0.591	0.549

Notes: Standard errors in parentheses. ** $p < 0.05$.

6 Discussion

Economic theory tells us that if a city taxes something with an elastic supply, the city will get less of that thing. Economic theory and research also tells us that if you decrease housing supply, prices go up.

Mandated IZ without sufficient offsetting subsidies is a tax on new construction of 20 units or more.

Data from Pittsburgh is limited - Pittsburgh does not build a lot of housing, so we only have 109 buildings of 20 units or more built since 2012 to evaluate - but what we have conforms with theory. Prior to the introduction of IZ, Lawrenceville was building at a pace similar to the Strip District and South Side Flats. After IZ was introduced, multifamily

housing production fell sharply.

7 Conclusion and Policy Recommendations

IZ in Lawrenceville has decreased construction of units per year in buildings of 20 units or more by 32% since it was implemented. While these results are not statistically significant due to the small sample size, they do match or exceed what we would expect them to be based on economic theory and other empirical studies. Theory and data align here - IZ, as currently implemented in Pittsburgh, has constrained the housing supply. This constraint has likely increased rent in the neighborhoods where IZ has been implemented.

Pittsburgh's local government should consider repealing its IZ overlay where it currently exists and not expanding it further. Alternatively, Pittsburgh should consider adjusting their IZ policy framework so that the IZ policy does not decrease housing construction. This ensures that the IZ policy will not cause a reduction in supply and the accompanying increases in rent that create the most harm for the bottom quintile of renters.

Some adjustments that Pittsburgh should consider include:

1. Make the IZ policy voluntary in order to provide greater flexibility for projects and ensure marginal projects are still built

2. Pair the IZ policy with substantial and meaningful upzoning - increases to building height and massing, reduction of setbacks, and other such policies - to make projects more economical

3. Ensure that adequate public subsidies are available to offset the entirety of the cost of providing Affordable Units

4. Help reduce development costs by streamlining and expediting the entitlement process for all projects complying with the IZ policy[22]

[22]It's worth mentioning that this is a laudable goal to aspire to on all projects - lower construction costs can help yield more abundant housing, and therefore lower rents

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Appendix A. Bunching

Bunching is a phenomenon where a developer might design a development in such a way as to avoid a regulation, and so the distribution of projects "bunches" right before a regulatory cutoff (Goldstein, 2023). In the case of the Pittsburgh IZ ordinance, which begins at developments over 20-units, we might expect to find developments that are either proposed at 19-units to avoid the mandate, or are downsized to 19 units following the introduction of the ordinance. We were able to find two examples of bunching that we hypothesize are a result of Pittsburgh's IZ ordinance:

1. Industrial Commons - 3809 Liberty Avenue Pittsburgh, PA 15201 - Lower Lawrenceville - clearly designed for 20 units, units 201 and 202 were combined into one unit to make 19 units. A comparison of the floorplans of the 2nd and 3rd floor make this obvious.

2. 3339 Ward St, Pittsburgh, PA 15213 - South Oakland - initial plans submitted Nov 2021 are for 20 units, new plans submitted Dec 2023 are for 19 units. Note that Oakland's IZ mandate went into effect April 26, 2022.

8 Appendix B. Literature Review

We leaned heavily on the wide body of empirical research on this topic as part of our exploration of the Pittsburgh implementation if IZ. Below are some of the scholarly works that are relevant to this research.

Silver bullet or Trojan horse? The effects of inclusionary zoning on local housing markets in the United States (Schuetz et al., 2011) - One of the earlier explorations of Inclusionary Zoning policies, published nearly a decade before Pittsburgh's first implementation

Upzoning with Strings Attached: Evidence from Seattle's Affordable Housing Mandate (Wang and Krimmel, 2024) - Discussion of how Seattle's Inclusionary Zoning mandate affected housing production in the affected neighborhoods and adjacent neighborhoods.

Inclusionary Housing Calibration Study (Kowta and Fairris, 2023) - This was a deep investigation commissioned by the city of Portland on their previous Inclusionary Zoning policy, and made recommendations for changes to align the policy more closely with achieving their desired outcomes.

Local effects of large new apartment buildings in low-income areas. Review of Economics and Statistics (Asquith et al., 2023) - An exploration of the effects locally when new apartment buildings are built, including conclusions on how new buildings affect rents nearby.

The effect of new market-rate housing construction on the low-income housing market. (Mast, 2023) - Follows chains of migration to describe the effect colloquially known as "filtering," whereby new units cause chains of moves that open up units in the bottom-quintile of the market.

The Effect of Inclusionary Zoning on the Housing Supply in US Cities: A Bunching Analysis (Goldstein, 2023) - This study describes a phenomenon called "bunching," where Inclusionary Zoning policies cause buildings to be built just under thresholds requiring mandated affordable units.

Modeling Inclusionary Zoning's Impact on Housing Production in Los Angeles: Tradeoffs and Policy Implications (Phillips, 2024) - Modeling of how Inclusionary Zoning policies effect the total number of units built across various affordability requirements.

Causal inference: The mixtape (Cunningham, 2021) - This is a guide of how to perform a Difference-in-Difference analysis that we used in our study.