Modeling the Impact of Rent Growth Caps On Washington State's Apartment Market

As housing prices have outpaced inflation both in Washington State and across the U.S., the cost of housing has been taking an increasingly large proportion of people's income. This trend can be explained in part by restrictive residential zoning laws and a myriad of regulations that have made it difficult for home construction to keep pace with population growth in many growing communities.

There have been some nascent movements, most notably the so-called YIMBY's, to push governments to pare back these building constraints. Seattle has an active YIMBY group that advocates for reduced exclusionary zoning practices. In May 2023, Washington enacted a law allowing four-plexes or six-plexes to be built in most city neighborhoods, but these victories have been few thus far, and it's too early to discern to what extent these will alleviate prices. Others attempt to mitigate prices through rent control policies, which have gained interest as housing has become more expensive.

Seattle and Washington State have each considered some form of rent control in recent years, along with numerous other communities across the country, and the Washington legislature is currently debating legislation that would cap future rent increases at seven percent per annum. To understand the effects of these rent control proposals on the apartment industry we constructed an economic model that we use to estimate the impact of a seven percent cap on rent increases in Washington and the Seattle metro area.

A seven percent rent growth cap affects the apartment industry in multiple ways. The reduction in current and future revenue from owning and constructing apartment homes impacts the long-term viability of building new units and reduces the expected gains from maintaining current units as well. The reduced revenue from rental homes reduces property values and--concomitantly--the property tax revenue generated. Our model allows us to estimate how a rent cap would impact each one of these.

When the price cannot adjust according to supply and demand inefficient outcomes result. Restricting the market for housing via rent control changes the allocation of housing investment and its distribution. Under normal conditions, rising rent levels would promote increased building, thereby alleviating the housing pressures pushing up rent. However, rent control blunts the price mechanism, causing a misallocation of housing investment within and across metropolitan areas.

We use data from the American Community Survey (ACS) and the Zillow Observed Rent Index to model the change in expected rents for landlords via historical rent increases. We assign a probability that an apartment owner is likely to see a demand spike resulting in a rental price increase that exceeds the seven percent cap in a given year. The expected changes are used to estimate new building and maintenance expenditures. We use the outputs of these two models to estimate the effect of rent caps on total income and, ultimately, property values in Washington and Seattle. All of our estimates reflect the impact of a seven percent rent growth cap on rental units in buildings with seven or more units.

Our analysis concluded the following:

- The estimated probability that an apartment in Washington would be affected by a seven percent growth cap is quite substantial at 46 percent, while the estimated probability in Seattle is 31 percent.
- The estimated rent discount for Washington and Seattle is 11 percent and nine percent, respectively.
- These figures correspond to a five percent reduction in rental value in Washington, and a two percent reduction in Seattle.
- We estimate that a seven percent rent growth cap would significantly reduce new construction each year. Washington would see a reduction in new apartment construction of 738 units annually or 7,380 over ten years, which is a decrease of about three percent. Seattle would face an estimated annual reduction of 283 units, or a two percent decrease.

- A seven percent rent increase cap would lead to an estimated reduction in maintenance spending of $16 million per year in Washington. Seattle would have an estimated annual reduction of $6 million.
- Total annual rental income loss for apartment owners in Washington is estimated to be over $57 million, while owners in Seattle would experience a total income loss of $23 million. These estimated losses result from the combination of restricting rents and reduced income from foregone construction.
- Income reductions translate into declines in apartment property value. We estimate aggregate property value losses to be $1.12 billion in Washington and $449 million in Seattle.
- The reduction in property values would also cause a reduction in revenue of $11 million per annum for Washington State, and $4 million for Seattle.

Expected Rent Model

We estimate the impact of a seven percent rent increase cap on apartment rents by modeling expected rent growth using data from the known rental distribution in Washington and Seattle. We used Zillow's Rental Listings dataset for multifamily apartments in buildings with seven or more units, which includes the median rent in each city from 2015 – 2022. Data on the median rent is combined with data on rents by city from the Zillow Observed Rent Index and the American Community Survey five-year sample data.

The model allows us to predict the probability that an apartment's rental price will grow by more than seven percent in a particular year, given the average rent from 2015 – 2022. This estimate is based on area median rent (R), and we create the expected value using a piecewise function for two separate cases: When the median rental growth is above the seven percent cap, and when growth is below the seven percent cap. We do this by estimating the following equations:

$$P_{m,y}\left(R_{m,y} > .07\right) = .5 + \left(R_{m,y} - .07\right) \; if \; R_{m,y} > .07$$

$$P_{m,y}\,(R_{m,y} >.\,07) = \frac{\sum_{i=1}^{n} D{=}1\ if\ N_{i,c,y} >.07}{n_{c,y}} if\ R_{m,y} <.07$$

Where P denotes the probability an apartment in Washington m, in year y will have rental growth above the specified cap of seven percent. R is the median metropolitan area rent growth rate and N represents the city price growth rate and n is the number of cities. We estimate $P(R > .07)$ for Washington and Seattle in each year between 2015 and 2022 then average those years to predict the probability of this occurring in future years using the equation

$$P_{m}\,(R_{m} >.\,07) = \frac{\sum_{y=2015}^{2022} R_{c,y} >.07}{7}$$

This probability estimate is conservative for a number of reasons: we effectively impose a uniform distribution of apartment rents near the median. The estimate also heavily discounts the probability that any apartment exceeds the rent cap when the median growth rate is less than the cap, although the distribution may be more even. Rent increases cover a wide distribution in urban markets, and we suspect that some proportion of rents exceed the cap in most non-recession years. When the median rent exceeds the cap, the model assumes linear price growth above the median. This assumption is imposed for tractability, but we strongly suspect it results in our model underestimating the proportion of rent increases over the cap as well as the impact of the cap on our variables.

We have median rental growth data for Washington for every year in our sample; however, the city growth data is less complete. In years where the median city area growth rate is less than seven percent and city data is sufficiently thin, we assume that no apartments grow above the cap and effectively build that into our predicted probability, which further depresses our estimates.

Once we have estimated the probability that rent growth is greater than the seven percent cap, we estimate its impact on the expected apartment rent by estimating

$$E(R) = P(R >.\,07) * dr_H + P(R <.\,07) * r_L$$

Where d is the discount applied to a given unit that would have had price growth higher than seven percent and r_H is the normal rent amount in cities with more than seven percent growth. Our estimate of r_L is the rental price for all units in cities with less than seven percent growth. Our estimate of d is the percentage difference in rent for apartments in cities that had greater than seven percent price growth. This gives us the price an apartment owner can expect to rent an apartment for, given a price cap imposed at seven percent.

The difference between $E(R)$ and the expected rents calculated without the discount factor d determines the extent to which apartment rents are limited by the seven percent cap.

Our results are below.

Model Output: Annual Rents

	Probability R>7%	Discount for Affected Units	Adjusted Rent	Percent Reduction
Washington	45.67%	11.40%	$1,521	4.50%
Seattle	30.56%	8.80%	$1,705	2.32%

Model results based on data from American Community Survey for median rents in the state of Washington and Zillow Observed Rent Index for cities within the state of Washington.

The predicted probability that a given unit would be affected by the rent cap is significant in Washington - almost 46 percent. We did a study in 2018 that used a similar model to estimate the effects of a seven percent rent cap, focusing on a number of cities including Chicago, Denver, Portland and Seattle. The estimated probability that a given unit would be affected by the cap was below 40 percent for each city, indicating that housing prices have continued to increase since that period.

While the model accounts for differences in rent growth across cities, it unavoidably underestimates the impact on rents for some units. We expect that

there will be a share of units that will be substantially more affected than our aggregate estimates suggest.

Rent Control's Impact on Long Term Investment in New Units

An apartment's rental price provides a signal to investors, builders and managers as to the potential profitability of new projects. Rent control blunts that market signal and--as a result--changes the supply of future apartment units. We estimate an empirical model of the relationship between rents and new apartment construction to understand the effects of a seven percent growth cap on long term investment in new units.

We estimate the relationship between apartment rents and new construction using a two-way fixed effects model. The model isolates the effect of rents on construction by accounting for factors that are fixed about a particular geographic area. We also account for factors that vary with time but are common across areas. The empirical model is as follows:

$$Y_{i,t} = \alpha + \beta X_{i,t} + \delta_i + \gamma_t + \varepsilon$$

Where $Y_{i,t}$ is the natural log of the number of new residential housing units in buildings with 5 or more units in Washington i in year t, $X_{i,t}$ is the natural log of the median apartment rental price of apartments in buildings with 5 or more units in Washington i in year t, δ_i represents a series of state-level fixed effects, and y_t represents a series of year-level fixed effects. The parameter of interest, β, can be interpreted as an elasticity because both the dependent ($Y_{i,t}$) and independent ($X_{i,t}$) variables are expressed in natural log form.

To construct $X_{i,t}$,we estimate the model using data on median rents from Zillow's Median Rent Listings for units in buildings with five or more units. Data on new residential housing units for five or more-unit buildings comes from the Census for years 2015 - 2022. We have 408 observations we use to estimate the model.

The model yields a point estimate for β of 0.74, indicating that given an annual rise in rents of 10 percent, construction increases by 7.4 percent. This estimate is statistically significant at conventional levels with a p-value of .0021, and the 95% confidence interval ranges from 0.11 to 1.36. The model explains 95 percent of the variation in new apartment construction in the data, which is evidence of a strong empirical relationship between apartment rental prices and construction. Higher apartment prices are a strong market signal which builders act on when making investment decisions. Notably, because these estimates use the change in median rents, they are likely to understate the effect on construction in cities that exceed the median.

Our model estimates are then applied to estimate the effect of a seven percent rent cap on annual apartment construction, with the following results.

Model Output: New Construction

	Expected Rent Reduction	Percent Reduction in New Building	Estimated Range	Annual Number of Units Reduced
Washington	4.50%	3.33%	[0.50% , 6.12%]	738
Seattle	2.32%	1.72%	[0.26% , 3.16%]	283

Model results based on estimated coefficient and 95% confidence interval for rent- building regression. Number of apartments determined at the percent reduction from average building of units in 2015-2022.

The model suggests that building decisions in Washington and Seattle would be substantially affected by a seven percent growth cap. We estimate that new construction would be reduced by 738 units in Washington annually, which corresponds to a 3.3 percent decline. Over the course of 10 years, the model estimates a reduction in new construction of 7,380 units. We estimate that new construction in Seattle would be reduced by 283 units annually, or a 1.7 percent decline.

Maintenance

Reductions in the amount of unit maintenance that building owners and managers perform may also be affected by rent control. Many studies have attempted to quantify the relationship between maintenance and rent control, but there is a lack of robust results, due to the difficulty in obtaining data on maintenance investment.

We choose to eschew previous estimates and directly model the relationship between rents and maintenance using a unique empirical model. Our equation is as follows:

$$M_{z,c} = \alpha + \sigma R_{z,c} + \theta_z + \pi_c + \varepsilon$$

Where $M_{z,c}$ is the natural log of the amount spent on maintenance over a two-year period for apartments in building size of z units in Washington c. $R_{z,c}$ is the monthly rental price for apartments in building size range z in Washington c, θ_z represents a series of apartment-size fixed effects, and π_c represents a series of metropolitan area-level fixed effects. The parameter of interest is σ which can be interpreted as an elasticity because both the dependent ($M_{z,c}$) and independent ($R_{z,c}$) variables are expressed in natural log form.

We use data from the American Housing Survey in 2017 and 2021 for apartments in the 15 largest metropolitan areas of the U.S to estimate rents and maintenance. We use the median dollars spent on home improvement activity in the preceding two years as a proxy for maintenance. When using the model estimates for calculation of average and cumulative effects, we divide coefficient estimates by two to be representative of annual effects. We have 73 observations in our model estimation.

The model estimates σ to be 0.46, which would indicate that for every 10 percent decrease in rents, the two-year maintenance expenditures for a unit will decline by 4.6 percent. This estimate is not statistically significant and the 95 percent confidence interval ranges from -2.59 to 3.51. The lack of a robust relationship between rent and maintenance in our data may be because home improvements are a poor proxy for rental maintenance, or we don't have enough observations, or that rents change maintenance expenditures differently across the distribution of rents.

The estimated effects on annual maintenance expenditures can be estimated by taking the expected rental price change given a seven percent growth cap. Applying the model estimates gives us the following:

Model Output: Maintenance Spending			
	Expected Rent Reduction	Percent Reduction in Maintenance Spending	Annual Dollars of Maintenance Spending Reduction
Washington	4.50%	2.07%	$16,456,447
Seattle	2.32%	1.07%	$5,974,202

Model results based on estimated coefficient for maintenance- rent regression. Total maintenance spending based on the number of apartment units in buildings with 5 or more units and median 2-year maintenance spending per unit of $2054 in the 15 largest metropolitan areas from the American Housing Survey 2017 and 2021.

The results come from the model's point estimate, or most likely result, but do not reflect the wide intervals, or uncertainty in our estimate. The model suggests a 7 percent growth cap would be followed by a large decline in maintenance: $16.4 million in Washington and $5.9 million in Seattle. These correspond to a 2.1 percent decline in Washington and a 1.1 percent decline in Seattle.

Total Income Loss

The total income losses for apartment owners is a combination of lost rental revenue for apartments affected by the rent growth cap and the reduction of units constructed as a result of the cap.

These changes are modeled using the estimates from rent loss and reduced new construction with the following equation:

$$I_m = E(R)_m * UL_m(cap) + RL(cap)_m * U_m$$

This equation shows that total income lost (I_m) in Washington will be a function of the expected rent that would have been received for units, $E(R)_m$, times the number of units lost due to the imposition of the cap $UL_m(cap)$, plus the expected rent reduction $RL(cap)_m$ on all existing units U_m.

The model produces the following output:

Model Output: Total Income Loss				
	Number of Existing Apartment Units	Expected Rent Reduction	Annual Number of Units Reduced	Total Annual Income Loss
Washington	774,474	4.50%	738	$56,632,735
Seattle	545,350	2.32%	283	$22,606,327

Model results based on income loss on apartment units in buildings with 5+ units. Number of apartment units from 2022 American Community Survey.

A 7 percent rent growth cap would produce staggering income losses for apartment owners. We estimate Washington would see an annual loss of $56.6 million, while Seattle would see a yearly reduction of $22.6 million.

Property Value Loss

The annual income lost due to imposing a cap on rent growth can be capitalized into property values. Like any piece of capital, property such as an apartment building has an asset value equal to the discounted future flow of revenues less costs. Future income losses are capitalized into the net present value of the current property price with the following equation:

$$NPV = \sum_{t=1}^{30} \frac{I_t}{(1+i)^t}$$

We estimate this equation by using the income loss from the previous model, and a 30-year project life-cycle. We use a range of discount rates (i), to reflect the uncertainty of this parameter. We estimate the model using a discount rate of 2.9%, the current equivalent 30 year Treasury Bill rate, a 7% rate reflecting the

historical return of the U.S. stock market, and an aggressive 10% rate. A higher discount rate leads to a smaller effect on current property values.

The model produces the following estimates:

Model Output: Property Values

	Total Annual Income Loss	Property Value Loss (high discount rate)	Property Value Loss (mid discount rate)	Property Value Loss (low discount rate)
Washington	$56,632,735	$533,871,944	$702,757,935	$1,124,513,568
Seattle	$22,606,327	$213,107,910	$280,522,842	$448,876,812

Low discount rate reflects the rate of return on a 30-year Treasury Bill, mid discount rate reflects the average historical U.S. stock market return, and the high discount rate is 10%

Using a conservative 30-year investment horizon and the Treasury Bill discount rate, we calculate aggregate property losses in Washington to be as high as $1.12 billion in Washington. Seattle's property value would decline by as much as $448 million.

If property value losses are realized in the assessment of property, then they would also be realized by diminished property tax collections. Using property loss estimates from the low-discount rate model, while assuming that property assessment follow market value losses, we are able to estimate the annual property tax revenue losses:

Model Output: Property Tax Revenue Loss

	Property Value Loss (low discount rate)	Annual Property Tax Revenue Loss
Washington	$1,124,513,568	$11,098,949
Seattle	$448,876,812	$4,250,863

State and Seattle property tax loss estimates based on average apartment property tax rates and King County, specifically, as reported by the Washington State Department of Revenue. These estimates reflect assessed value fully reflecting market value changes.

Following the strong assumption that assessed building values fully incorporate market values, we estimate that annual property tax revenues in Washington would decrease by over $11 million annually. Seattle's property tax revenues would be reduced by just over $4 million each year.

Conclusion

A seven percent cap on rent increases would have a significant impact on the apartment rental market in Washington. We estimate that almost 46% of apartment units would be affected by the policy, altering a number of market outcomes. Restricting rent growth reduces the ability of investors, builders and managers to use apartment rents as a signal of potential future profitability, thus blunting the market's pricing mechanism and changing future supply. Our models estimate that new apartment construction would be reduced by 7,380 units over a decade, while also negatively impacting maintenance expenditures.

Property values would also be lower than without the rental caps by roughly $1.1 billion, which would result in property tax revenues diminishing by 11 million dollars per annum.

The seven percent growth cap would also reduce annual income for owners, which ultimately gets capitalized into falling property values. Falling property values could cause a decline in local wealth, local property tax collected and sales tax on new construction, among other effects not fully explored here.

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