New Housing Slows Rent Growth Most for Older, More Affordable Units

Data show that limited supply aligns with greatest rent increase in low-income neighborhoods

Appendix: Methodology

Researchers for The Pew Charitable Trusts used regression analysis to understand ZIP code rent change across the income distribution and building-level rent change in various building types.

Rent change across the income distribution. Pew analyzed ZIP code-level rent growth from Oct. 31, 2017, to Oct. 31, 2024, using Zillow Observed Rent Index (ZORI) rent estimates, controlling for ZIP-code level and metropolitan area-level characteristics that may influence rent growth. ZIP code-level characteristics include median household income quartiles, population, population density, median home values, median rent levels, non-White population share, rentership rate, share commuting by transit or nonmotorized means, share working from home, housing supply growth, average rent burden, and inequality from the U.S. Census Bureau's 2013-17 American Community Survey (ACS) five-year estimates. Pew accounted for COVID-19-related work location changes using ZIP code-level work-from-home share from the ACS 2019-23 five-year estimates, since the pandemic may have shifted demand preferences for different neighborhoods. Metropolitan-area variables include population, population density, and median home value from ACS 2013-17 five-year estimates, housing unit growth from 2017 to 2023, in-migration share since 2017, and nonlocal in-migration under $35,000 income share from the ACS 2019-23 five-year estimates, as well as 2000 to 2017 housing price appreciation from the Federal Housing Finance Agency, Federal Housing Administration mortgage origination share from 2005 to 2017, and 2005 to 2017 mortgage denial rates from the Housing Mortgage Disclosure Act. Pew transformed population, home value, and contract rent, using natural logarithms to normalize the distribution and for tractability of coefficients, and clustered standard errors at the metropolitan-area level.

ZORI covers 1,675 ZIP codes, including both metropolitan and micropolitan areas. Furthermore, only three ZORI ZIP codes are in micropolitan areas, as defined by the U.S. Census Bureau, while the other 1,654 are in metropolitan areas. Pew restricted this analysis to the ZIP codes within metropolitan areas only for a clearer comparison, but sensitivity analyses including all micropolitan areas produce substantially similar results.

Because ZORI only covers a share of all ZIP codes, researchers were aware of the possibility of selection bias of ZIP codes included and not included by ZORI. Pew corrected

for potential selection bias by using a Heckman selection model, which first estimates the probability of being included in ZORI and then estimates the impact on rent change. The selection model includes the following ZIP code-level variables: population (log-transformed), median home value (log-transformed), median contract rent (log-transformed), non-White share, and renter share.

Regression results suggest that from 2017 to 2024, rent growth was higher in the lowest-income quartile ZIP codes than in the highest-income quartile ZIP codes. (See Appendix Table 1.) Metropolitan-level unit growth and ZIP code-level unit growth is statistically significantly negatively correlated with rent growth. The impact is even greater among high-growth metropolitan areas. ZIP code-level controls that are associated with a decreased rent growth rate include population, ZIP code unit growth, population, median home value, median contract rent, rentership rate, share of nonmotorized commuters, and share working from home in 2023. In contrast, rent burden and share working from home in 2017 are positively associated with rent growth. At the metropolitan-area level, unit growth rate is negatively associated with rent growth, while pre-period mortgage denial rates and in-migration rate are positively associated with rent growth.

Regressions using average ZIP code income derived from the Internal Revenue Service's Statistics of Income data for 2017 instead of the ACS 2013-2017 median household income produces substantially similar results.

Appendix Table 1. Regression 1 Results

Figure 1 regression. Impact of ZIP code and metropolitan-area variables on 2017 to 2024 rent change, for ZIP codes within metropolitan areas

Heckman selection model	Number of obs	=	15,806
(regression model with sample selection)	Selected	=	1,654
	Nonselected =		14,152
	Wald chi2(15)	=	1573.07
Log pseudolikelihood = -2305.568	Prob > chi2	=	0.0000
(Std. err. adjusted for 374 clusters in cbsa)			

DV: Rent growth 2017 to 2024	Coefficient	Robust std. err.	z	P>z	[95% conf.	interval]
ZIP code-level variables						
Income quartiles (Highest quartile is control)						
Third quartile	0.031903	0.010754	2.97	0.003	0.010825	0.052981
Second quartile	0.075566	0.016886	4.48	0	0.04247	0.108661
Lowest quartile	0.102637	0.026589	3.86	0	0.050524	0.15475
ZIP unit growth 2017-23	-0.14117	0.034255	-4.12	0	-0.20831	-0.07403
Ln 2017 population	-0.09663	0.010334	-9.35	0	-0.11689	-0.07638
Population density 2017	0.000	0.000	1.110	0.269	0.000	0.000
Ln 2017 median home value	-0.06991	0.025255	-2.77	0.006	-0.11941	-0.02041
Ln 2017 median contract rent	-0.08495	0.05055	-1.68	0.093	-0.18403	0.014129
Non-White_share 2017	-0.02522	0.047023	-0.54	0.592	-0.11738	0.066945
Renter_rate2017	-0.33833	0.062444	-5.42	0	-0.46072	-0.21594
Share commuting by transit 2017	-0.08726	0.111933	-0.78	0.436	-0.30664	0.132127
Share nonmotorized commuting by transit 2017	-0.26412	0.100277	-2.63	0.008	-0.46066	-0.06758
Share working from home 2017	1.414571	0.409833	3.45	0.001	0.611313	2.21783
Rent burden 2017	0.008	0.002	3.360	0.001	0.003	0.013
Gini 2017	0.033	0.187	0.180	0.860	-0.334	0.400
Share working from home 2023	-0.300	0.169	-1.780	0.076	-0.631	0.031

Metropolitan area-level variables						
Metropolitan-area unit growth 2017-23	-0.5411	0.25687	-2.11	0.035	-1.04456	-0.03765
Ln 2017 population	0.002	0.018	0.090	0.931	-0.034	0.037
Ln 2017 median home value	0.043	0.082	0.520	0.602	-0.118	0.204
Population density 2017	0.000	0.000	-0.420	0.675	0.000	0.000
Home price appreciation index 2000 to 2017	0.000	0.001	-0.660	0.509	-0.002	0.001
FHA mortgage share 2005-2017	-0.308	0.288	-1.070	0.285	-0.872	0.256
Mortgage denial rate 2005-2017	1.055	0.409	2.580	0.010	0.253	1.857
In-migration share 2017-2023	0.961	0.451	2.130	0.033	0.078	1.845
Nonlocal migration share with income below $35,000	-1.160	1.552	-0.750	0.455	-4.202	1.882
Constant	2.063	0.754	2.740	0.006	0.585	3.540
Selection model						
DV: Is ZIP code in ZORI?						
Ln 2017 population	1.222	0.052	23.320	0.000	1.119	1.324
Ln 2017 median household income	-0.760	0.231	-3.290	0.001	-1.213	-0.307
Ln 2017 median home value	0.186	0.103	1.800	0.071	-0.016	0.388
Ln 2017 median contract rent	0.001	0.000	7.940	0.000	0.001	0.001
Non-White_share 2017	-0.437	0.274	-1.590	0.111	-0.975	0.101

Constant	-8.292	2.482	-3.340	0.001	-13.156	-3.428
/athrho	-0.311	0.079	-3.930	0.000	-0.467	-0.156
/lnsigma	-2.037	0.043	-47.870	0.000	-2.120	-1.953
Rho	-0.302	0.072			-0.436	-0.155
Sigma	0.130	0.006			0.120	0.142
Lambda	-0.039	0.010			-0.059	-0.020

Wald test of indep. eqns. (rho = 0): chi2(1) = 15.41   Prob > chi2 = 0.0001

Rent change by building type. Pew analyzed building-level rent growth from 2023 to 2024 using data from RealPage. Building-level data was downloaded from RealPage's free online portal for buildings within the 150 largest metropolitan areas in the U.S., creating an analysis sample of 41,109 buildings within 5,995 ZIP codes. Pew estimated an ordinary least squares regression to identify the impact of building type on rent change, controlling for both building-level and ZIP code-level characteristics. (See Appendix Table 2). Building-level characteristics come from RealPage and include building class (A, B, or C), occupancy, age, age squared, number of units, number of stories, and average unit square feet. ZIP code-level characteristics come from the 2019-2023 ACS five-year estimates and include population (log-transformed) and rentership rate. Pew estimated a second specification of the same regression model restricted to just properties in metropolitan areas with 2017 to 2023 unit growth above 10%. (See Appendix Table 3).

Results indicate that Class B and Class C buildings had larger rent decreases than Class A buildings during this time period. In high-supply metropolitan areas, this effect was even more pronounced. In both models, rent increases were associated with higher occupancy, slightly older buildings, and larger units, while decreases were associated with buildings with more units and more stories.

Appendix Table 2. Regression 2 Results: All Metropolitan Areas

Figure 3 regression. Impact of building- and ZIP-level variables on 2023-2024 rent change

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Linear regression            Number of obs   =   41,109
                F(10, 222)    =    50.27
                Prob > F     =   0.0000
                R-squared    =   0.0743
                Root MSE     =   .0745
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Linear regression   Number of obs   =   41,109

         F(10, 222)   =   50.27

         Prob > F   =   0.0000

(Std. err. adjusted for 223 clusters in cbsa_num)

Dependent variable: Annual rent change	Coefficient	Robust std. err.	z	P>z	[95% conf.	interval]
Building class type (Class A is control)						
Class B	-0.021	0.003	-8.480	0.000	-0.026	-0.016
Class C	-0.043	0.004	-10.170	0.000	-0.051	-0.034
Occupancy (Yes = 1)	0.315	0.018	17.280	0.000	0.279	0.351
Building age	0.001	0.000	9.450	0.000	0.001	0.001
Building age ^2	0.000	0.000	-6.960	0.000	0.000	0.000
Number of units	0.000	0.000	-2.540	0.012	0.000	0.000
Number of stories	0.000	0.000	1.850	0.065	0.000	0.001
Average unit square feet	0.000	0.000	3.150	0.002	0.000	0.000
Ln 2023 ZIP code population	-0.005	0.001	-3.660	0.000	-0.008	-0.003
ZIP code rentership rate	-0.025	0.006	-4.000	0.000	-0.037	-0.013
Constant	-0.247	0.022	-11.470	0.000	-0.289	-0.205

Table 3. Regression 2 Results: High-Supply Metropolitan Areas

Figure 3 regression. Impact of building- and ZIP-level variables on 2023-2024 rent change for metropolitan areas with at least 10% unit growth from 2017 to 2023

Linear regression   Number of obs   =   12,861

         F(10, 54)   =   97.36

         Prob > F   =   0.0000

         R-squared   =   0.0987

         Root MSE   =   .07681

Linear regression   Number of obs   =   12,861

         F(10, 54)   =   97.36

         Prob > F   =   0.0000

(Std. err. adjusted for 55 clusters in cbsa_num)

Dependent variable: Annual rent change	Coefficient	Robust std. err.	z	P>z	[95% conf.	interval]
Building class type (Class A is control)						
Class B	-0.032	0.003	-10.9	0	-0.038	-0.026
Class C	-0.064	0.005	-12.0	0	-0.075	-0.053
Occupancy (Yes = 1)	0.286	0.021	13.7	0	0.244	0.328
Building age	0.001	0.000	8.0	0	0.001	0.002
Building age ^2	0.000	0.000	-3.7	0.001	0.000	0.000
Number of units	0.000	0.000	-2.0	0.052	0.000	0.000
Number of stories	-0.001	0.000	-1.4	0.168	-0.001	0.000
Average unit square feet	0.000	0.000	4.0	0	0.000	0.000
Ln 2023 ZIP code population	-0.002	0.003	-0.8	0.421	-0.008	0.003
ZIP code rentership rate	-0.020	0.009	-2.210	0.031	-0.038	-0.002
Constant	-0.284	0.032	-8.790	0.000	-0.349	-0.219