The Fiscal Effects of Housing Prices: Evidence from School Districts

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Abstract

This paper examines COVID-19 pandemic led to changes in the housing market in the United States that led residents to move away from city centers to suburbs, and that has potential fiscal implications for the local governments. Using school district-level data from 2006 to 2022, I employ difference-in-differences methods to measure the impact of pandemic-driven housing market changes on local government revenues and expenditures. Results indicate evidence of an increase in revenues generated from collecting property taxes. Districts mainly drive the effect at the intermediate distance from the city, which are relatively less dense areas. The overall expenditures did not increase significantly, but I found a slight growth in spending toward debt services, employee benefits, and general government needs.

Keywords: COVID-19, Housing Value, Local Government Finance, School Spending, Taxation, Causal Inference

JELs: E62, R30, R10

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1. Introduction

Urbanization has historically fueled global economic growth and development. In the United States, major metropolitan hubs, including New York, Los Angeles, and San Francisco, emerged as magnets for high-skilled workers and industries, driving significant increases in housing costs (Gyourko et al., 2013; Nieuwerburgh, 2022). However, the COVID-19 pandemic disrupted these trends, eliciting a migration towards suburban areas due to health concerns and the widespread adoption of remote work (Nieuwerburgh, 2022; Gupta et al., 2021). This induced substantial shifts in the real estate market, leading to reduced housing demand and prices in urban cores and rising property values in suburban areas (Ramani et al., 2021; Gupta et al., 2021; Liu et al, 2021; Althoff et al., 2020; Rosenthal et al., 2022).

These market dynamics have profound spillovers, and fiscal implications for local governments, particularly concerning property tax revenues- a critical source for funding public goods like education, infrastructure, and other government services (Nieuwerburgh, 2022). In 2020, property taxes accounted for approximately 71.7% of local tax collections[1] in the United States, underscoring their importance. Given the lag in property tax adjustments to housing market changes, a decline in urban property values coupled with rising suburban values creates fiscal pressures. Local governments may face choices to raise tax rates or adjust public services, impacting the attractiveness of these areas for residents and firms (Stijn, 2022)This raises questions about how such revenue shocks influence local government spending and whether property tax policies should be adjusted in response to pandemic-driven shifts.

[1] https://taxfoundation.org

This study examines the fiscal impacts of COVID-19-induced shifts in the housing market on local governments in New York State. Specifically, it explores how changes in housing value influenced their revenues and expenditures. I utilize sources such as the New York State Comptroller for local finance information, Zillow housing data, and census data from ACS and construct an original panel dataset to capture granular fiscal changes. I also use the Integrated Public Use Microdata Series- Geographic Information System (IPUMS-GIS) to assign and aggregate zip codes to school districts as a unit of observation and track housing value information.

By employing a difference-in-differences approach and event study design, I identify the effects of housing price changes as an exogenous shock on property tax revenues and spending patterns across school districts. The study also investigates heterogeneities in these effects, particularly in districts at varying distances from New York City.

The findings contribute to the literature by demonstrating how COVID-19 reshaped the fiscal landscape for local governments. Districts with higher post-pandemic housing price increases experienced significant growth in property tax revenues, though expenditures remain relatively stable. Some increases are directed toward debt servicing and employee benefits. The results are robust to various sensitivity checks described in the paper. Additionally, the placebo test finds the results consistent with the baseline model (Figure 8 and 9).

I explored factors that reflect heterogeneities in the findings. Districts at intermediate distance from the city drive my main results. Second, the effects are stronger in relatively denser districts. I also observe slightly higher revenue in low-income districts but higher spending in high-income districts. These results have important implications for understanding the resilience of local government finances to economic shocks and for informing future policy considerations regarding public finance management.

This paper is related to and builds on several strands in the real estate and public finance literature. First, a growing body of literature investigates the Covid effects that have caused\ significant shifts in the housing market, focusing on the spatial redistribution of housing demand and its impact on property values. Gupta et al. (2021), using zip-code-level data for the 30 largest U.S. metropolitan areas, found that COVID-19 flattened the bid-rent curve. Increased exposure to work-from-home (WFH) reduced demand for city-center housing, while demand surged in less dense suburban areas, signaling future growth in suburban rental markets. Similarly, Ramani et al. (2021) identified the "donut effect," a term used to describe the migration of households and activity from city centers to suburban regions.

Other studies corroborate these findings. Couture et al. (2021) used cell phone data to document significant outflows of people from urban centers like New York City. Liu et al. (2020) analyzed the reduced demand for density in the U.S. housing market, while Davis et al. (2021) focused on housing price changes across major cities. Researchers have also studied the pandemic's broader economic effects. Kahn et al. (2020) and Cajner et al. (2020) explored private labor market adjustments, while Brueckner et al. (2021) examined spatial equilibrium changes. These studies highlight the pandemic's transformative impact on housing markets and migration patterns.

Despite these insights, there remains limited evidence of its effects on public finance, particularly in how shifting housing values influence local government revenues and expenditure patterns. Property taxes, a cornerstone of local government revenue, are directly tied to property values and constitute a significant share of tax collections. Thus, second, the pandemic's impact on property tax revenues is twofold. First, declining urban property values due to out-migration and reduced demand for city-center housing could lower tax revenues for urban localities. Second,

suburban areas experiencing rising property values may see increased property tax revenues. This duality raises important questions about the net effect of these changes on local government finances.

This paper adds to the existing literature by studying how suburban governments allocate additional revenues. Do they invest in public goods or offset fiscal pressures elsewhere? Moreover, how persistent are these changes in property values and tax revenues?

Several studies provide preliminary insights into these dynamics. Chernick et al. (2020) and Clemens et al. (2020) forecast revenue shortfalls for state and local governments due to pandemic-induced economic disruptions. Clemens et al. (2021) further examined the employment effects of fiscal shocks and federal relief packages. Green et al. (2020) studied the relationship between fiscal pressures and state-level employment, while Gordon et al. (2020) explored the effects of revenue declines on school district funding. Gustafson et al. (2022) investigated risks to municipal finances arising from pandemic-induced location preferences, and Giesecke et al. (2022) analyzed how local governments adjust tax rates to stabilize revenues during economic shocks.

However, gaps remain in understanding the causal effects of pandemic-driven housing market shifts on local government revenues and expenditures. While existing research highlights broad trends, few studies examine these effects at the district level or differentiate between urban and suburban contexts. Thus, the second contribution of this study is it builds on a novel dataset that integrates geo-coded information from zip codes and school districts, allowing analysis at the school district level. While most COVID and housing market studies rely on MSA or zip code-level data, this approach accounts for tax collection variations across school districts, providing a more granular understanding of local government finances.

Third, unlike prior studies that rely on asset models, ordinary least squares, or fixed effects methods, I address potential endogeneity and bias issues. By treating housing prices as an exogenous shock to districts further from New York City, I minimize endogeneity concerns in the model. In addition to a baseline difference-in-differences approach, I employ propensity score matching as a robustness check to control for selection bias. This paper aims to address these gaps by focusing on the fiscal implications of COVID-19-induced changes in housing values for local governments in New York State. By leveraging school district-level data and employing a robust empirical strategy, this study provides new insights into how local governments respond to housing market shocks and how these responses vary across regions.

The remainder of the paper proceeds as follows: Section 2 discusses the data used to build a school district-level tax revenue and expenditure database, connecting housing values. Section 3 outlines the baseline model of the housing market's effect on local government financing. Section 4 presents empirical results; sections 5 and 6 document the robustness checks and heterogeneity, respectively. Sections 7 and 8 discuss and conclude.

2. Data

I constructed a comprehensive panel dataset combining housing value indices, local government finances, and census data, using New York State school districts, as a unit of observation[2].

I obtain housing values data from the Zillow Housing Value Index (ZHVI) information, adjusted for seasonality and housing characteristics, which includes both single- and multi-family units at the zip code level. The data is aggregated at the school district level using population-

[2] I take districts outside NYC for looking at the impact on local government finances.

weighted averages of zip codes within each school district. I use the geodata from IPUMS-GIS[3] shapefiles and crosswalk files to match ZCTAs to aggregate zip-code information into school districts. (steps are explained in Appendix 1).

The local finance data is obtained from the New York State Comptroller[4] (2006-2022), covering revenues[5] and expenditures across categories such as education, debt services, and social services[6].

I merge ZHVI and local finance data to create a unified panel spanning 2006-2022, and integrate NCES-EDGE[7] data for socio-economic characteristics, including income, poverty, race, rural status, age, and education.

I restrict our main sample in several ways. First, I limit the sample to traditional school districts only, excluding charters and special education systems. Second, I drop a few observations on school districts where I do not have information on local finance and housing value. Third, I excluded the zip codes with incomplete GIS data. The final sample includes 681 New York State school districts from 2006 to 2022. Table 1, columns 1 and 2, presents summary statistics.

3. Model and Estimation

The potential challenge in estimating the causal effect of COVID-induced housing price shocks is that districts affected by steeper price shocks are more likely to experience positive revenue changes, creating a risk of biased estimates. To address this, I employ a difference-in-

[3] Integrated Public Use Microdata Series- Geographic Information System (IPUMS-GIS), https://www.nhgis.org/
[4] Office of NYS comptroller, https://www.osc.state.ny.us/reports/finance/2022-fcr/taxes
[5] I use information on revenues collected from real property taxes by combining all the components associated with property taxes.
[6] I drop social services as it has almost all missing observations. It does not affect the total expenditures, excluding social services.
[7] National Center for Education Statistics (NCES)- Education Demographic and Geographic Estimates (EDGE), https://nces.ed.gov/programs/edge/ .The American Community Survey Education Tabulation (ACS-ED) is a custom tabulation of the ACS produced for the National Center of Education Statistics (NCES) by the U.S. Census Bureau. I obtain this information from 2014-18.

differences (DiD) approach with a two-way fixed-effects model based on housing price shock thresholds to isolate the causal effects.

First, I define a binary treatment variable based on the Zillow Housing Value Index (ZHVI) for the year 2020. Districts with housing values above the 75th percentile are in the treatment group with a value of 1, while those below serve as controls with a value of 0. Table 1, columns 3 and 4 depicts the summary statistics of the school districts in the treatment group, and columns 5 and 6 present a summary for the control group.

To assess the impact of housing markets on revenues and expenditures, I then begin by employing an event-study specification designed to track effects over time:

$$y_{it} = \sum_{-4}^{2} \gamma_j T_{j,it} + X_{ic}\theta_t\kappa + \delta_c + \lambda_t + \eta_{it} \quad (1)$$

Here, y_{it} denotes the outcome for district i in year t, and $T_{j,it}$ are lead and lag indicators, representing periods around the shock event. X_{ic} includes baseline district characteristics[8], while δ_c and λ_t control for county and time-fixed effects, respectively, and η_{it} is a random disturbance term. The year 2020, when the shock occurred, is set as the reference year with pre and post-treatment periods spanning from four years before to two years after[9].

To strengthen causal identification and increase precision, I complement the event-study approach with a standard difference-in-differences (DiD) model:

[8] Characteristics included are school district level socio-economic characteristics including median income, fraction of educated BA and above, fraction of the population at or below the poverty line, fraction white, fraction 65 or older

[9] I re-center the year a housing price shock happens so that $T_{0,it}$ always equals one in the year the shock happens, that is 2020 in district i.

$$\log(y_{it}) = \alpha_0 + \alpha_1 T_{it} + X_i\theta_t + \delta_c + \lambda_t + \varepsilon_{it} \quad (2)$$

The variable T_{it} indicates districts experiencing a housing price shock in 2020. The coefficient α_1 estimates the average treatment effect on treated districts. It is defined as follows: Let Y (0) and Y(1) denote potential outcome variables, where 0 denotes districts with no shock and 1 denotes districts with shock. The observed outcome for a school district is $Y = D_i\, Y(1) + (1-D_i) \times Y(0)$, where D_i is HPI shock. The average treatment effect on the treated districts α_1 is then derived as:

$$\alpha_1 = E(Y(1) - Y(0)|D_i = 1) = E(Y(1)|D_i = 1) - E(Y(1)|D_i = 0) \quad (3)$$

To control the unobserved county heterogeneities on outcome variables, I include a set of county-specific fixed effects, δ_c. The year-specific fixed effects λ_t to control the HPI shock to outcomes. The random variable ε_{it} is an error term.

To further explore the impact on expenditure components, I extend the DiD model:

$$\log(y_{it}^e) = \alpha_0 + \alpha_1 Treat_{it} + X_i\theta_t + \rho_c + \lambda_t + \varepsilon_{it}, \quad (4)$$

This specification, $\log(y_{it}^e)$ captures specific expenditure categories, including culture, education, debt, employee benefits, and general government spending. This detailed decomposition helps reveal how different expenditure components respond to housing price shocks.

4. Empirical Results:

The results suggest that housing price shocks provided local governments with a one-time revenue boost, while total expenditures did not increase significantly. The event-study plot in Figure 1 shows the local governments' revenue increased significantly by approximately 0.5% following the COVID-induced housing value shock. The expenditures, however, remain

insignificant (Figure 2). This may reflect a scenario where districts temporarily benefit from elevated property tax revenues without immediately adjusting expenditure trends. The increase in housing prices, potentially driven by migration to suburban areas during COVID-19, explains the rise in revenues but not the proportional increase in expenditures.

I then analyze how housing shocks translate into expenditure components. Specifically, spending on culture and recreation remains unchanged, whereas debt repayments increase significantly (Figure 3). Educational services initially rose but declined by 2022 (Figure 4). Employee benefits (Figure 5) and general government services (Figure 6) show slight but significant increases. These findings suggest that short-term revenue gains are prioritized for critical expenditures, while other spending adjustments occur over the longer term.

Further, the DiD estimates for equation 2 showed a statistically significant increase of 0.04 % in local government revenues from property taxes due to a housing price shock. This effect persists after controlling for median income, educational attainment, poverty rates, racial composition, and age demographics, all interacting with a linear trend. The result also indicates a slight but statistically insignificant rise in total expenditures. The discrepancy between revenue and expenditure increases may stem from the immediate revenue gains associated with elevated property taxes, while expenditure adjustments depend on the timing and allocation of these resources. Lastly, the effect of housing price shocks on specific expenditure categories is found to be significant for spending on debt repayment, education, and general government purposes increases significantly by 0.13%, 0.01%, and 0.07%, respectively.

5. Robustness Checks

To validate the robustness of results, I conduct sensitivity checks to assess the robustness of results using the baseline model (Table 2, Column 2), presented in table 3. First, I adjusted for the threshold**,** by replacing the 75th percentile threshold with the mean housing value index. Second, I excluded pre-2008 data (to account for the 2007-08 financial crisis). Third, I omitted the districts in the bottom 1st and top 99th revenue. Finally, I modified the control variables from the baseline model. I found a significant increase in revenues, while overall expenditures were insignificant, consistent with the baseline model.

Then, to identify potential biases, I perform a placebo test by assigning 2017 as the shock year, excluding actual shock years. Table 4 confirms that the PLACEBO-house variable has no significant impact on revenues or expenditures. Figures 15 and 16 validate these findings in the event-study framework, affirming the model's robustness and absence of omitted variable bias.

Last, to address selection bias, I estimate average treatment effects using propensity score matching. Figure 7 demonstrates sufficient overlap between treated and control districts. Table 8 corroborates significant revenue increases due to housing price shocks, consistent with the baseline model. Expenditure effects are concentrated on debt repayment, education, employee benefits, and general government activities, reinforcing the findings.

6. Heterogeneity

This section explores variations in the impact of housing price shocks on local government finances across different district characteristics, including distance from city centers, population density, and income levels.

As a first test for heterogeneity, I categorize school districts into three groups based on their proximity to city centers: (1) near-city districts, (2) intermediate-distance districts, and (3) far-distance districts. Distances are calculated using latitude and longitude coordinates from the IPUMS Census Bureau's Gazetteer files. Table 5, column 1 shows no significant effect on revenues or expenditures for near-city districts. Column 2 reveals significant positive revenue effects driven by property tax increases for the district at an intermediate distance from the city. Expenditures on debt, employee benefits, and general government purposes also increased significantly. Column 3 shows no significant effects for far-distance districts, likely due to lower housing demand. These findings suggest that the COVID-19 housing shock primarily benefited intermediate-distance districts, where suburban migration increased housing demand and property tax revenues. Limited changes in expenditures may reflect the short observation period and gradual fiscal adjustments.

Second, I examine variations by population density, I grouped districts into low-density and high-density categories. Table 6 summarizes the results in the low-density districts as a significant increase in revenues but with no notable changes in expenditures. Both revenues and expenditures increase significantly in high-density districts, reflecting a quicker fiscal response to revenue changes.

Lastly, I classify districts into low- and high-income groups to assess income-level heterogeneity[10]. Table 7 reports the results that revenues increase significantly in low-income

[10] The income information is collected from ACS-ED 2014-18.

districts, driven by housing price shocks. And, for high-income districts, expenditures rise, particularly on debt repayment and general government services.

The overall finding here highlights that the fiscal impacts of housing price shocks are unevenly distributed. Proximity, population density, and income levels play crucial roles in determining the extent of revenue and expenditure changes across districts.

7. **Discussion**

The findings of this study indicate that COVID-induced housing market changes significantly affected the finances of local governments. Suburban migration during the pandemic, as supported by Gupta et al. (2021) and Ramani et al. (2021), drove higher real estate prices outside city centers. Figure 13 illustrates a noticeable increase in the housing price index[11].

Contrary to existing literature (e.g., Chernick et al., 2020), which reports revenue losses for local governments during COVID, this study finds positive revenue impacts. The discrepancy can be explained by the focus of this paper on property tax revenues in suburban districts, whereas prior studies concentrated on city-centric revenues. These findings suggest potential welfare gains for suburban areas amidst revenue declines in urban centers. Additionally, this paper hypothesizes a causal relationship between exogenous housing price shocks and district finances, advancing the understanding of public finance during the pandemic.

While revenues increased significantly, overall expenditures showed a delayed response. However, slight increases in spending on debt services and general government functions, particularly in intermediate-distance and low-density districts are found to be significant. These

[11] It is aggregated at the county level.

patterns align with prior studies, such as Chakrabarti et al. (2013, 2015), which documented varied fiscal impacts across New York and New Jersey districts during the Great Recession.

The findings carry important policy implications for local governments navigating economic shocks. First, the local governments may need to consider dynamic property tax policies to better align revenues with changing housing markets. But this would also depend on how labor market takes the pandemic shack, also leaving scope for future corroboration. As many studies have empirically found a rising work-from-home culture post-pandemic. Whether people will still migrate would also depend on the persistence of work-from-home trends. If remote work persists, further increases in suburban housing demand could permanently alter property tax revenues and spending priorities. Second. the uneven fiscal effects across districts emphasize the need for targeted policies to address disparities in revenue generation and public service funding. The relationship between housing market dynamics and fiscal stress warrants further investigation to better understand its impact on public welfare and policy.

8. **Conclusion:**

This paper provides causal evidence of the impact of COVID-19-induced housing price shocks on local government finances. Utilizing data on local property revenues and expenditures from the New York State Comptroller and housing prices from Zillow, I apply a difference-in-differences methodology, and event study design, leveraging variation across districts in upstate New York. The findings reveal a significant increase in revenues, while overall expenditures remain unchanged. These results are robust to variations in control groups, the length of pre- and post-periods, and sample blocks.

The granularity of the data enables an exploration of heterogeneous effects across districts. I find the school districts at the intermediate distance exhibit the most pronounced financial impacts, with significant revenue gains. Additionally, less dense districts experience higher revenue increases, and lower-income districts show slight heterogeneity in their financial outcomes.

Appendix 1: District House price aggregation

I constructed the measure of district-level housing values from 2000-22 as follows- Within each district, there are J zip codes. I weight the zip code indices by the 2010 zip code decennial population, $n_{j,2010}$ as a share of the 2010 district aggregate population

$\omega_j = \frac{n_{j,2010}}{\sum_{j=1}^{J} n_{j,2010}}$;

where $\sum_{j=1}^{J} \omega_j = 1$.

Thus, the district-level housing price outcome is population-weighted zip code price average, that is

$P_{d,t} = \sum_{j=1}^{J} \omega_j P_{j,t}$

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Tables and Figures

1. Tables

Table 1: Summary Statistics (in millions)

	Full Sample		Districts with HPI		Districts w/o HPI	
	1	2	3	4	5	6
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Total revenue	3.08	3.7	6.7	4.7	2.1	2.7
Total expenditure	5.9	7.9	9.4	7.8	5.1	7.7
Components of Expenditure						
Culture and recreation	3.8	4.4	3.8	4.4	1.3	1.8
Debt services	3.1	3.7	7.0	4.7	2.1	2.6
Education	3.0	3.7	6.8	4.8	2.1	2.7
Employee benefits	3.0	3.7	6.8	4.8	2.1	2.7
General government	3.0	3.7	6.8	4.8	2.1	2.6
Control variables*						
Median income	14.7	47.3	23.7	84.1	13	32
Fraction BA or Higher	0.1	0.1	0.1	0.0	0.1	0
Fraction White	0.8	0.1	0.7	0.1	0.9	0.1
Fraction Poor	0.0	0.0	0.0	0.0	0.0	0.0
Fraction Age 65+	0.1	0.0	0.1	0.0	0.1	0.0

Note: Number of Districts are 681 and Number of Observations are 10,955.

* Values are for overall revenue and expenditures in million dollars.

Table 2: DiD Effect of Zillow Housing value index (ZHVI) on local finances

	Treatment: ZHVI (0/1)	Treatment: ZHVI (0/1)
	(1)	(2)
Dependent Variables (in log):		
Revenue	0.045***	0.023***
	(0.008)	(0.010)
Expenditures	0.033***	0.010
	(0.010)	(0.009)
Components of Expenditures		
Culture and recreation	0.200	0.037
		(0.203)
Debt services	0.017***	0.127***
	(0.007)	(0.054)
Education	0.016**	0.0150***
	(0.008)	(0.007)
Employee benefits	0.0363***	-0.006
	(0.007)	(0.008)
General government	0.061**	0.063**
	(0.030)	(0.033)
Social services	0.431	0.063
	(0.260)	(0.123)
Expended Controls	No	Yes

Note: Clustered (Census Block Group) standard-errors in parentheses

Significance Codes: ***: 0.01, **: 0.05, *: 0.1

Table 3: Effect of Zillow Housing value index, Sensitivity Checks

	District Total		Debt services		Education		Employee benefits		General govt.	
Specification/ Sample	Rev	Expd	Rev	Expd	Rev	Expd	Rev	Expd	Rev	Expd
Baseline	0.023***	0.010	0.017***	0.128***	0.013**	0.012**	0.037***	-0.006	0.061**	0.063**
	0.010	0.010	0.007	0.054	0.006	0.006	0.007	0.008	0.030	0.033
1	0.0219**	0.013	0.023***	0.075*	0.024***	0.019**	0.022***	-0.008	0.022**	0.049*
	0.010	0.010	0.007	0.049	0.008	0.011	0.008	0.008	0.008	0.031
2	0.0232**	0.002	0.016***	0.115**	0.015**	0.003	0.015**	-0.009	0.014**	0.0435
	0.010	0.009	0.006	0.053	0.007	0.008	0.007	0.008	0.007	0.033
3	0.010*	0.015	0.013**	0.093*	0.009*	0.001	0.013**	-0.007	0.013**	0.061*
	0.006	0.010	0.006	0.053	0.006	0.006	0.006	0.008	0.006	0.033
4	0.023	0.012	0.018***	0.106**	0.012**	0.002	0.017**	-0.005	0.015*	0.069**
	0.010	0.010	0.007	0.054	0.006	0.006	0.008	0.008	0.008	0.033
5	0.009*	0.012	0.013**	0.089*	0.012**	0.002	0.011*	-0.007	0.010*	0.075**
	0.085	0.010	0.006	0.051	0.006	0.006	0.006	0.008	0.006	0.033
6	0.020**	0.017*	0.010**	0.152***	0.019***	0.015**	0.010*	0.001	0.009*	0.049
	0.010	0.010	0.005	0.056	0.008	0.007	0.006	0.008	0.006	0.032
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered (Census Block Group) standard errors in parentheses. Rev: Revenue; Expd: Expenditures. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1. 1 Change Threshold; 2 Restrict sample by year; 3 Remove outliers; 4 Drop higher revenue districts; 5 Drop lowest revenue districts; 6 Expanded controls. FE stands for fixed effects.

Table 4: Effect of Zillow Housing value index, Placebo Test

	District Revenues	District Expenditures
Specification/ Sample		
Baseline	0.030	0.009
	(0.009)	(0.010)
Change Threshold	0.007	-0.006
	(0.008)	(0.007)
Controls	Yes	Yes

Notes: Clustered (Census Block Group) standard-errors in parentheses.

Significance Codes: ***: 0.01, **: 0.05, *: 0.1

Table 5: Heterogeneity by Distance[12]

	1	2	3
	Treatment: ZHVI (0/1)	Treatment: ZHVI (0/1)	Treatment: ZHVI (0/1)
Revenue	0.016	0.044***	0.019
	(0.011)	0.015	(0.016)
Expenditures	0.005	0.031**	-0.018
	(0.008)	(0.016)	(0.011)
Components of Expenditures			
Culture and recreation	0.161	0.112	0.078
	(0.373)	(0.189)	(0.196)
Debt services	-0.001	0.160*	-0.026
	(0.100)	(0.092)	(0.051)
Education	-0.013	0.022	0.018
	(0.009)	(0.010)	(0.014)
Employee benefits	0.013	0.022*	0.004
	(0.009)	(0.013)	(0.014)
General government	0.152	0.097**	0.016
	(0.487)	(0.047)	(0.087)
Expended Controls	Yes	Yes	Yes

Note: Clustered (Census Block Group) standard-errors in parentheses

Significance Codes: ***: 0.01, **: 0.05, *: 0.1

1= districts near city, 2= districts in intermediate distance from city, 3 = districts far from city

[12] 1. I worked with other thresholds as well as a robustness check. Our results are consistent with the results mentioned in the table.
2. I looked at the distance from Bronx County centroid here. I checked for other county centroids as well, the results are not mentioned here but are robust to the finding in the table here.

Table 6: Heterogeneity by Density[13]

	1	2
	Treatment: ZHVI (0/1)	Treatment: ZHVI (0/1)
Revenue	0.044**	0.034***
	(0.019)	(0.012)
Expenditures	-0.022	0.030***
	(0.012)	(0.015)
Expended Controls	Yes	Yes

Note: Clustered (Census Block Group) standard-errors in parentheses

Significance Codes: ***: 0.01, **: 0.05, *: 0.1

1.= low density districts, 2= high density districts

Table 7: Heterogeneities by Income[14]

	Low-income districts	**High income districts**
	Treatment: ZHVI (0/1)	Treatment: ZHVI (0/1)
Revenue	0.044**	0.001
	(0.022)	(0.008)
Expenditures	-0.021	0.0142*
	(0.013)	(0.013)
Components of Expenditures		
Culture and recreation	0.372*	0.075
	(0.193)	(0.214)
Debt services	-0.110**	0.255***
	(0.0512)	(0.086)
Education	0.010	0.003
	(0.010)	(0.008)
Employee benefits	0.011	0.001
	(0.011)	(0.000)
General government	-0.066**	0.0725**
	(0.034)	(0.052)
Expended Controls	Yes	Yes

Note: Clustered (Census Block Group) standard-errors in parentheses

Significance Codes: ***: 0.01, **: 0.05, *: 0.1

[13] I worked with other thresholds as well as a robustness check. Our results are consistent with the results mentioned in the table.

[14] I worked with other thresholds as well as a robustness check. Our results are consistent with the results mentioned in the table.

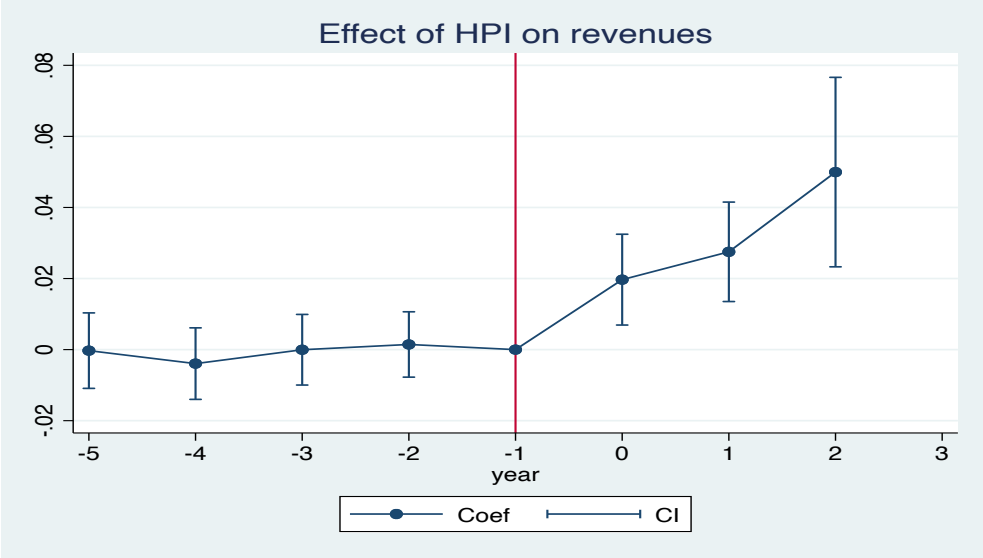
Table 8: Propensity Score Matching (Effect of Zillow Housing value index (ZHVI) on local finances)

	Treatment: ZHVI (0/1)
Dependent Variables (in log):	
Revenue	0.522***
	(0.139)
Expenditures	0.641
	(0.449)
Components of Expenditures	
Culture and recreation	-0.384
	(0.338)
Debt services	0.436**
	(0.121)
Education	0.633**
	(0.084)
Employee benefits	0.565**
	(0.092)
General government	0.670***
	(0.084)
Expended Controls	Yes

Note: Clustered (Census Block Group) standard-errors in parentheses

Significance Codes: ***: 0.01, **: 0.05, *: 0.1

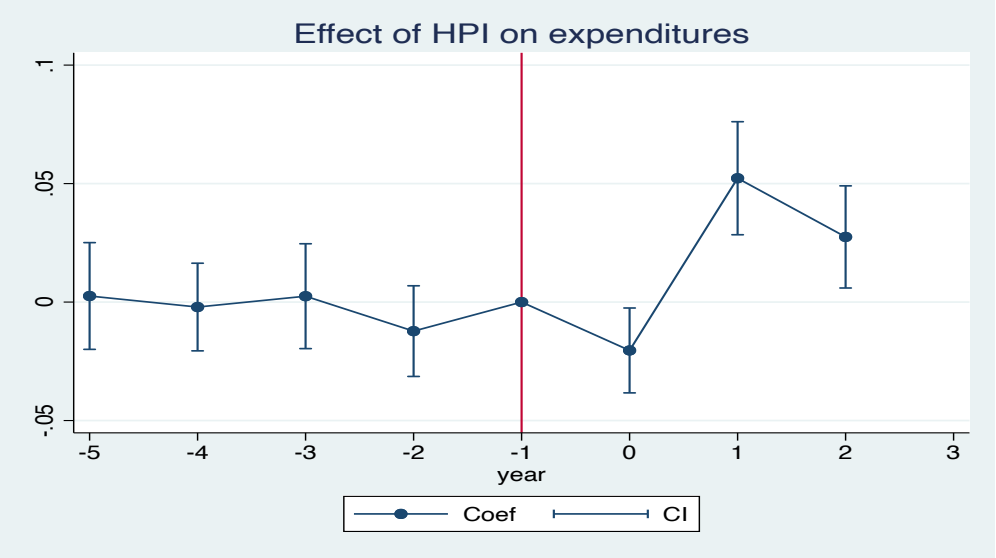
Figure 1: Impact of housing shock on revenues: Event study



Source: Own calculation

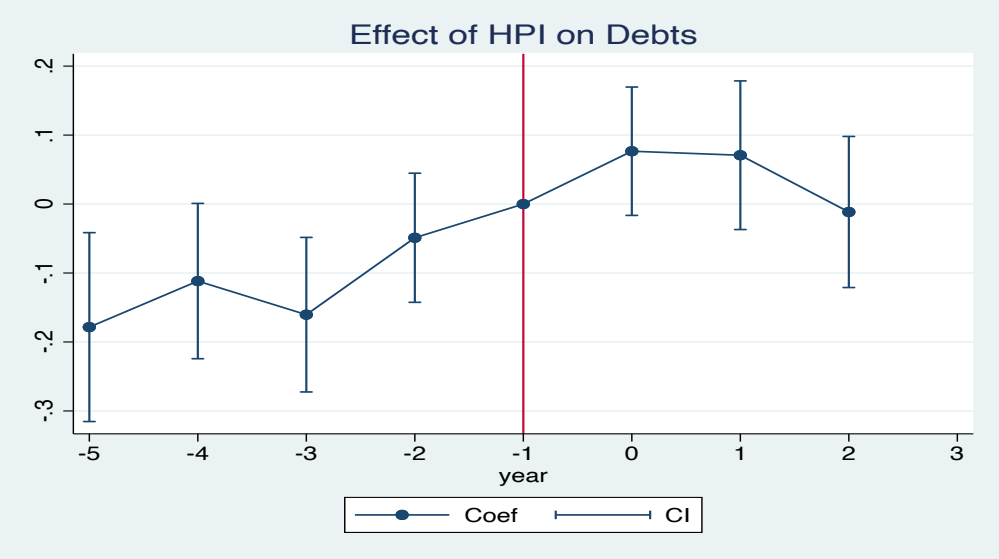
Note: Figure depicts coefficients of interest – indicators for the 4 years before a housing value shock and the years after, with the year before a change serving as the reference– from event study regressions on the local government's revenues at the school district level, based on equation (1).

Figure 2: Impact of housing shock on expenditures: Event study



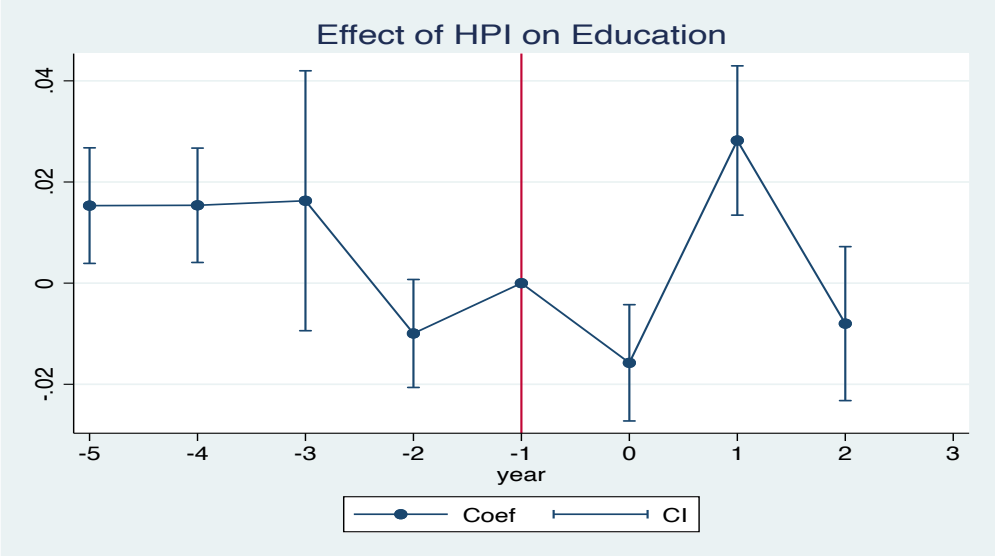
Source: Own calculation

Figure 3: Impact of housing shock on expenditure towards debt: Event study



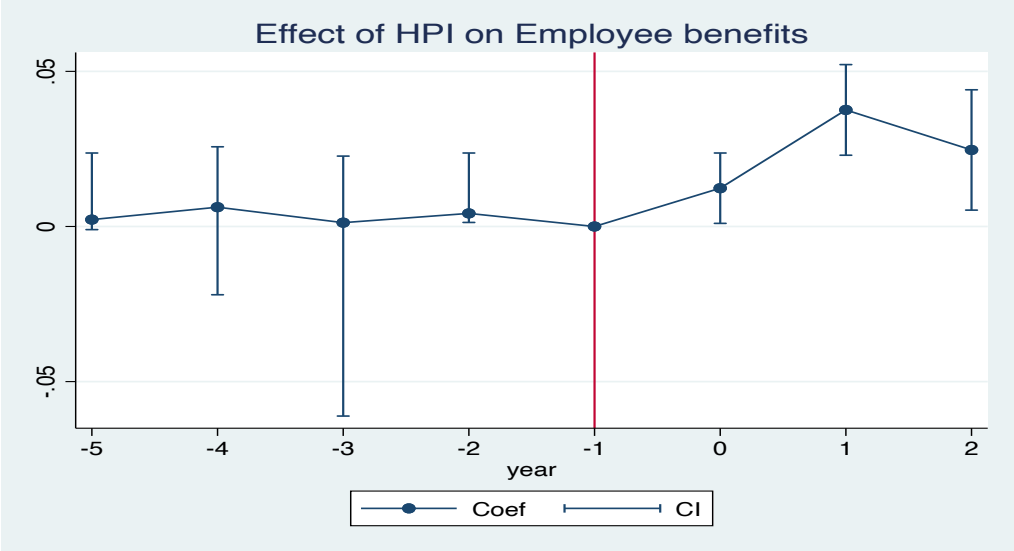
Source: Own calculation

Figure 4: Impact of housing shock on expenditure towards education: Event study



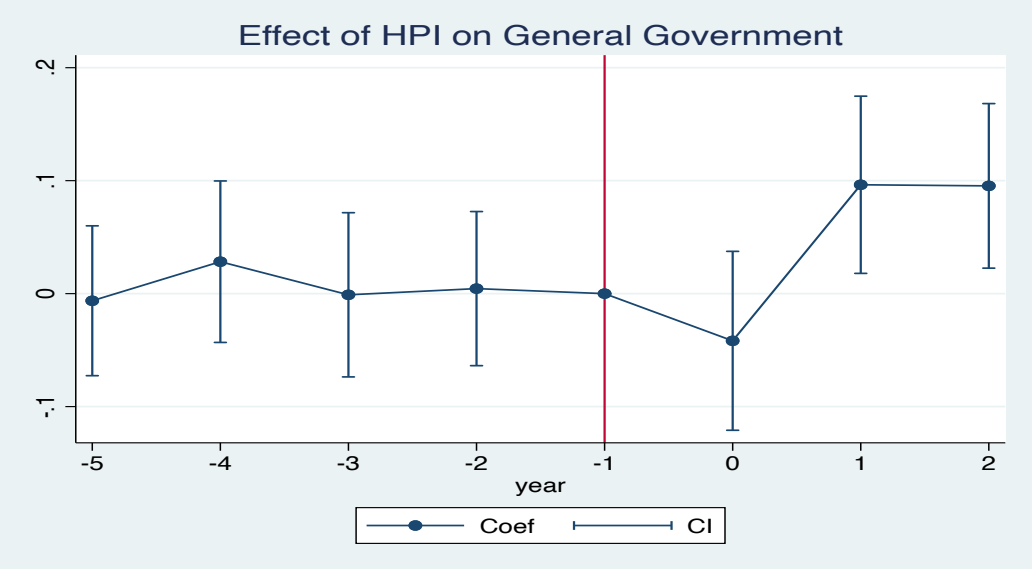
Source: Own calculation

Figure 5: Impact of housing shock on expenditure towards employee benefits: Event study



Source: Own calculation

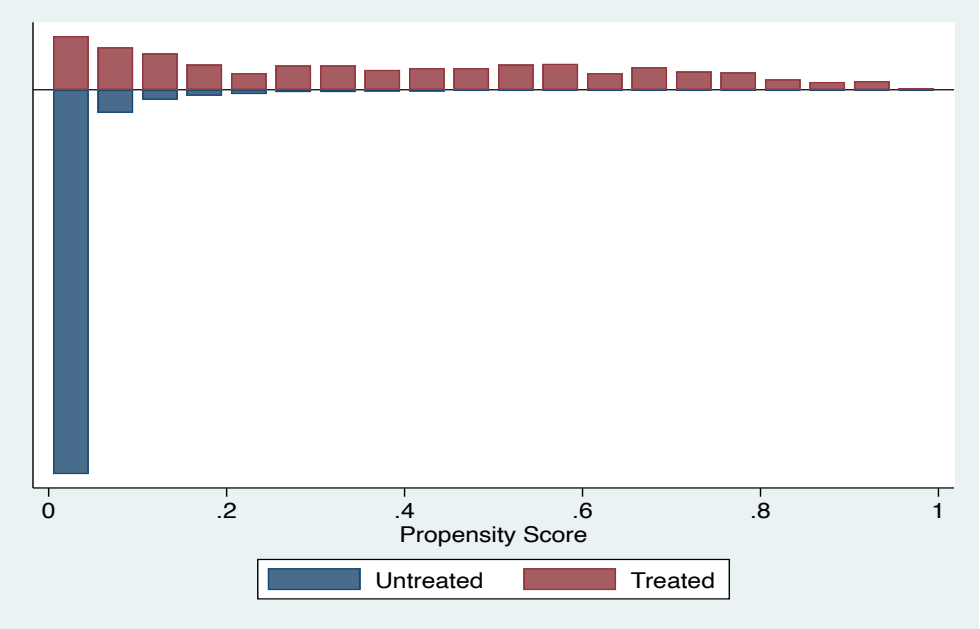
Figure 6: Impact of housing shock on expenditure towards general government purposes: Event study



Source: Own calculation

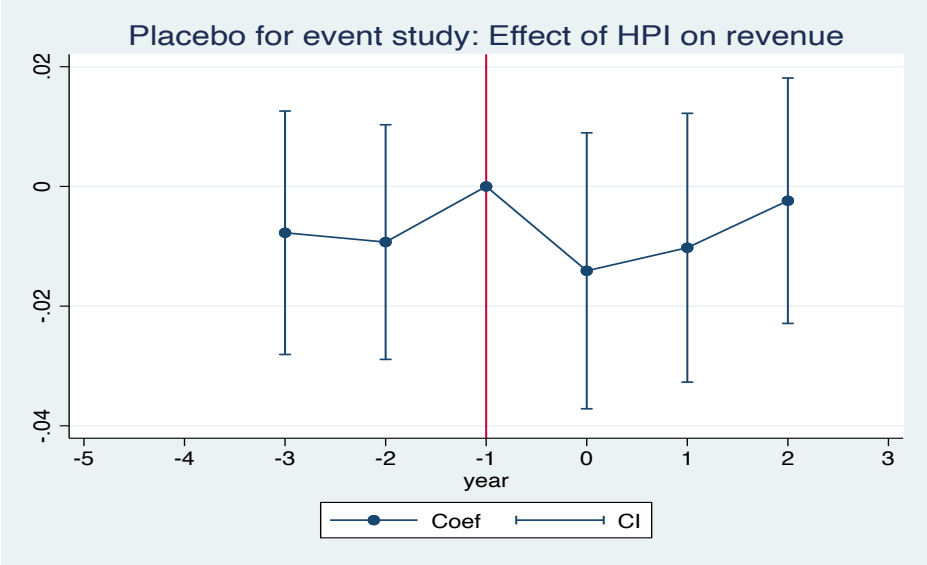
Note: Figures 2.2b, 2.3a-e depict coefficients of interest – indicators for the 4 years before a housing value shock and the years after, with the year before a change serving as the reference– from event study regressions on the local government's overall expenditures and various components of spending at the school district level, based on equation (1).

Figure 7: Common support



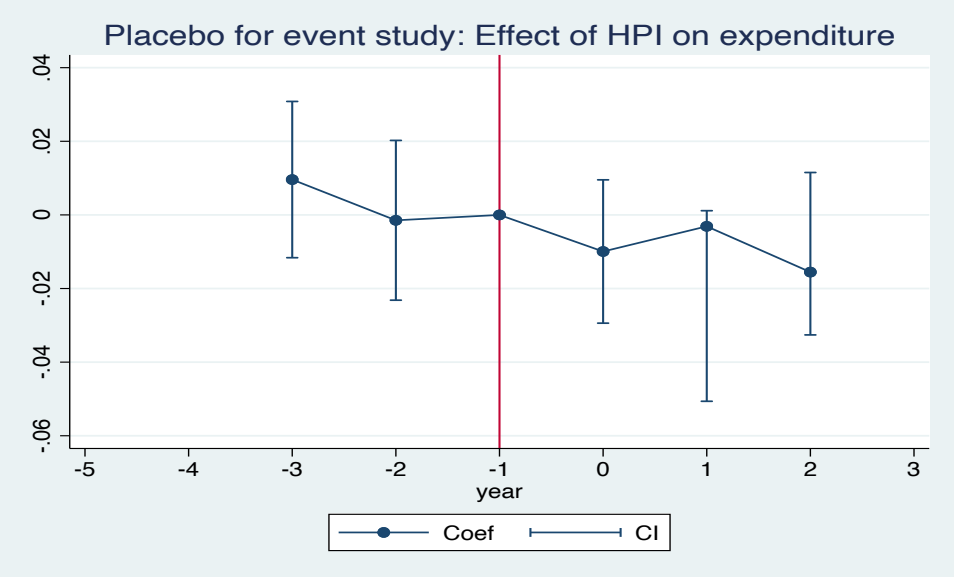
Source: Own calculation

Figure 8: Placebo for event study: Effect of HPI on revenues



Note: Figures depict PLACEBO-house coefficient interest– indicators for the randomly assigned year 2017 as the year of shock and years after, with the year before a change serving as the reference– from event study regressions on the local government's revenues at the school district level.

Figure 9: Placebo for event study: Effect of HPI on expenditure



Note: Figures depict PLACEBO-house coefficient interest– indicators for the randomly assigned year 2017 as the year of shock and years after, with the year before a change serving as the reference– from event study regressions on the local government's overall expenditures at the school district level.