Do Unfunded Obligations of Public-Sector Pension Plans get Capitalized into House Prices?

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Abstract

This paper examines the degree to which unfunded obligations of public-sector pension plans are capitalized into house prices. While there has been a growing focus on the size of unfunded pension obligations of state and local governments, their impact on local housing markets has been far less analyzed. Given the large number of local pension plans from the state of Pennsylvania, we turn to the state. Using data on house prices from the Decennial Census of 1990 and 2000 and the 2007-2011 American Community Survey, we find no evidence that unfunded pension obligations are capitalized into house prices.

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1 Introduction

Unfunded pension obligations of state and local governments and housing markets matter for the state of the national, state, and local economies. Although each topic has individually received attention from lawmakers and researchers, they have rarely been viewed in unison.

As far as unfunded pension obligations go, much has been said and written about the growing unfunded pension obligations of state and local governments (for example, Novy-Marx and Rauh (2011), Novy-Marx and Rauh (2014) and Biggs and Smetters (2013)). Bankruptcies of cities such as Stockton, San Bernardino, and most notably, Detroit, has also brought the issue of public-sector pensions into focus as unfunded pension and health care obligations of public-sector employees were key drivers behind the decisions of these municipalities to file for bankruptcy. While the implications of unfunded pension obligations on the fiscal condition of state and local governments has been examined, the impact of these unfunded obligations on local housing markets has been under-studied.

Researchers have examined how variations in the provision of local public goods can explain some of the observed variations in house prices. In this literature, variations in school quality have received the most attention and the literature suggests large price effects: higher school quality – whether measured in the form of test scores on standardized tests or arbitrary distinctions embedded in school report cards made publicly available – leads to higher house prices (Bogart and Cromwell (1997), Bogart and Cromwell (2000), and Figlio and Lucas (2004)). Authors have exploited the tools available to the applied researcher drawing in particular on the regression discontinuity (RD) design framework that involve say, examining houses on either side of school boundaries (Black, 1999) or examining the outcome of school bond referenda in close elections and the impact of passage of such referenda on house prices (Cellini, Ferreira, and Rothstein, 2011).

The goal of this paper is different in that it seeks to examine the extent and degree to which unfunded pension obligations get capitalized into house prices. The primary advantage we possess over the settings that have been examined earlier pertains to the availability of data. We examine the variation of house prices across various municipalities within the state of Pennsylvania. Pennsylvania provides a rich setting for the empirical analysis as it accounts for over 1,400 or roughly two-fifths of the distinct public-sector retirement systems in the U.S. The existence of such a large number of retirement systems in Pennsylvania can be attributed to its complex system of local government. General purpose local governments – cities, boroughs, and townships – total approximately 2,600 units. Moreover, unlike other states with a large number of municipal governments such as New York and California where most municipalities (but for the largest) are part of a larger state-wide pension plan, that is not the case in Pennsylvania. A slight majority of the 2,600 general purpose local governments in the state administer and operate their own pension plans for their employees.

Our analysis draws on pension data which are available on a biennial basis for the period 1985–2011 while data on house prices are available from the Decennial Censuses of 1990, 2000, and the 2007–2011 American Community Survey (ACS). We use two empirical approaches: in the first empirical approach, we use the fact that the boundaries of school districts and municipalities do not overlap. Pennsylvania with approximately 2,600 municipalities, has only about 500 public school districts. The fact that nearly every school district includes multiple municipalities within its borders allows us to control for school quality through the introduction of school fixed effects. Essentially we can examine variation in house prices that belong to the same school district but are spread across multiple municipalities and hence have differing level of pension obligations. Also, given the panel nature of the data, we can introduce municipal fixed effects and examine if higher unfunded pension obligations translate to lower house prices for a given municipality.

Our second empirical approach relies on comparing house prices in municipalities that are geographically "close" to each other. We compute distances between all municipalities in Pennsylvania and in our estimation only include municipalities that lie within a pre-specified threshold as the "control group" for a municipality and examine the relationship between house prices and unfunded pension obligations across those municipalities. Regardless of the threshold we use for identifying geographically "close" municipalities, whether it is 3 or 5 (base case) or 10 miles, we fail to find any evidence which suggests that unfunded pension liabilities of municipalities are capitalized into house prices.

2 Literature review

A striking feature of the housing market is the large variation in house prices across jurisdictions. Looking at the median sales price of existing single-family homes for metropolitan areas, we note that housing prices in the priciest metro, San Jose-Sunnyvale-Santa Clara in California, are higher by a factor of roughly 12 compared to the cheapest metro, Cumberland that spans the Maryland-West Virginia border. Focusing on a less extreme example, we still find meaningful variations when we look at metros in the 25th and 75th percentiles of the price distributions, with prices of $143,200 in Champaign-Urbana, IL and $222,700 in Durham-Chapel Hill, NC. Understanding the factors that drive these variations in house prices has been the strand of a large research literature. In public economics in particular, researchers have examined the role of local public goods such as public schools, parks, and recreational facilities in explaining variations in house prices.

With respect to the existence of unfunded pension obligations, a number of explanations have been proposed. These focus on the differences in borrowing costs of citizens from the pension fund relative to the costs of borrowing in the private market (Mumy, 1978) or the desire of current residents to move out of a given jurisdiction and pass on the costs of these pensions to future residents (Inman, 1982), a theory with some empirical support (Johnson, 1997). Epple and Schipper (1981) conjecture that increased political competition may induce politicians to underfund pension liabilities so as to be able to reduce taxes in the short-run; this behavior is rewarded by those voters who are unaware of deferred pension obligations. This idea is formalized in Glaeser and Ponzetto (2014) and finds empirical support in Bagchi (2016). These papers suggest that voters are unable to discipline politicians and constrain them to balance their public pension plans.

Even though political markets may not be efficient enough to weed out politicians who run deficits in their pension plans, one might believe that financial or housing markets might provide such discipline. With financial markets, if the decision by a politician to run a deficit in the pension fund leads to a higher interest rate on municipal bonds issued by that jurisdiction, then those higher borrowing costs may partly or fully offset the benefits accruing from underfunding pensions. Likewise with housing markets, although current taxpayers may think that the decision to run a deficit in the pension fund simply passes on the costs of these obligations to future generations that may not be the case if house prices adjust to reflect these unfunded pension obligations. In particular, if housing markets correctly anticipate the cuts to public spending and/or tax increases that would be required down the road to make whole on the pension promises, then house prices would be lower in jurisdictions with unfunded pension obligations and result in lower wealth for homeowners. That lower wealth, when viewed on a flow basis, may end up offsetting, either partly or wholly, the income gains resulting from taxes that are low relative to the pension promises being made to public-sector workers in those jurisdictions. Finally, beyond the financial stakes involved in transactions occurring in these markets, both financial and housing markets involve intermediaries who are likely to be more sophisticated than the median voter – investment bankers and municipal finance professionals in the context of financial markets and real estate brokers and agents in the context of housing markets. Consequently, one has reason to be optimistic that even if political markets are less than fully efficient and allow unfunded pension obligations to persist in equilibrium, the discipline provided by financial and housing markets can serve as a counterweight and dampen the desire of politicians to run deficits in their pension plans.

Although the empirical evidence is relatively thin, what empirical evidence does exist causes us to be less optimistic and the overall takeaway is that neither financial markets nor housing markets provide enough discipline in practice to curb the tendencies of politicians to run deficits in their pension plans. Although the large unfunded pension obligations should have implications for states' ability to meet their financial obligations and a measurable impact on their funding costs, Burson et al. (2014) who look at this issue find "limited evidence that municipal bond markets are pricing the risks to states' fiscal health arising from these large obligations."

As far as the question of capitalization of unfunded pension obligations in house prices is concerned, the evidence is mixed but also not overwhelmingly in favor of capitalization. Epple and Schipper (1982) examine variation in house prices across census tracts within various municipalities in the Pittsburgh SMSA and find some evidence that pension obligations are capitalized in house prices. However, given data availability, their preferred specification in the 1976 data is based on only 50-60 observations (census tracts) contained in 10 jurisdictions and 25 jurisdictions in the 1978 data. While the focus of Inman (1982) is different from capitalization, the results can be seen as supporting the view that politicians, arguably representing taxpayers, and public-sector unions act "as if" there is no capitalization. This is also supported by Leeds (1985) who describes the direct effect of pension underfunding as being zero, and views underfunding as a form of "hidden taxation."

In contrast to the findings and conclusions of these earlier papers, MacKay (2014) finds that the a public announcement that unfunded liabilities for the San Diego City Employees' Retirement System were higher than had been previously understood to be, led to price drops for houses in San Diego. Comparing the sales of homes on either side of the city boundary before and after the disclosure, he finds a 3.5-4.5% decrease in house prices for the three years following the announcement. Viewed in light of the earlier studies which find somewhat limited evidence in favor of capitalization, it may be that the disclosure of the unfunded pension obligations provided information to market participants and once it was announced, the unfunded pension obligations in San Diego showed signs of being capitalized.

3 Data

We primarily use two data sources for our analysis. Data on municipal pensions are based on status reports compiled by the Pennsylvania Public Employee Retirement Commission (PERC). These reports are available on a biennial basis for the period 1985-2011 and include the name of the municipal entity offering the plan, the employee group covered, the actuarial liabilities, actuarial assets, and number of active members in the plan. Using these reports, I construct a measure of unfunded liabilities per capita, defined as (Actuarial Liabilities across all municipal plans - Actuarial Assets across all municipal plans)/ Population.

We use data from the Decennial Censuses of 1990, and 2000 and the 2007-2011 ACS for our measure of house prices. The dependent variable in our analysis is the (log) median value of a house in the municipality and as controls we include the number of rooms and the year of construction for the median house in the municipality. We also include log of median household income as a control in all specifications. In our more elaborate specifications, we include a measure of population growth and population density as house prices are likely to be higher in places with higher density that are growing rapidly.

4 Empirical approach

We merge the Census-ACS data with the data on pensions in order to examine whether unfunded pension liabilities get capitalized into house prices, controlling for other factors that are also likely to have an independent influence on house prices. Given the frequency of the respective datasets, we match house prices in 1990, 2000, and 2009 (available from the Decennial Censuses of 1990, 2000, and the 2007-2011 ACS) with the unfunded liabilities of municipal pensions measured as of 1989, 1999, and 2009. Thus the simplest specification is:

$$log(P_{mcst}) = \alpha + \beta_1 * UA_{mct} + \beta_2 * C_{mt} + \beta_3 * X_{mt} + \gamma_t + \varepsilon_{mcst} \tag{1}$$

where:

- P_{mcst} is the median price for all houses in municipality m in school district s in county c at time t.
- UA_{mt} is unfunded liabilities across all municipal pension plans per capita in municipality m at time t;
- C_{mt} are characteristics for the median structure in the municipality, viz. the number of rooms and the year of construction;
- X_{mt} are municipal level controls. All specifications include the log of median household income and more complete specifications include the log of population density and population growth over the ten-year period.
- Lastly, γ_t are year fixed effects.

The above specification absent any modification compares house prices across parts of the state that may have little in common, comparing, for example, the affluent, Western suburbs of Philadelphia (the

"Main Line"), to parts of the state that have undergone deindustrialization over the second half of the 20th century. Therefore, I progressively introduce more specific geographic controls starting with county fixed effects. Subsequently, I introduce school district fixed effects and municipal fixed effects. A specification with municipal fixed effects compares house prices for the same municipality across different years and examines if a change in the level of unfunded liabilities for that municipality is subsequently reflected in house prices.

Given that housing markets are highly local, this approach of trying to control for local variations through fixed effects may be inadequate in practice. In Allegheny County itself for example, we see municipalities that are flourishing such as Fox Chapel Borough (where the median house price was $531,100 in 2009) and others that are distressed and have been under state oversight for a number of years such as Duquesne City (where the median house price was $40,500 in 2009). Therefore, the second empirical approach I adopt is to compute a measure of distance between any two municipalities in the state and only include municipalities that lie within a pre-specified threshold in the estimation. The pre-specified threshold we use is 5 miles as municipalities that are within 5 miles of each other could be viewed as fairly close substitutes by the typical homebuyer. On average, a municipality gets matched with four other municipalities, but there is significant variation in the underlying number of matches with 135 municipalities not being matched with any other municipality and four municipalities getting matched with 31 other municipalities that all lie within a 5-mile radius of that municipality.[2]

5 Results

Our first set of results are presented in Table 2. They include all municipalities and attempt to control for variation in neighborhood characteristics through the introduction of fixed effects. Columns (1) through (4) present estimates from a parsimonious specification which only includes log of median household income as a municipal control while columns (5) through (8) are drawn from a more elaborate specification which also include the log of population density and population growth over the previous decade as controls. Columns (2) and (6) introduce county fixed effects, columns (3) and (7) introduce school district fixed effects, and columns (4) and (8) introduce municipal fixed effects.

[Table 2 about here.]

[2]Distances between any two municipalities are computed using the latitude and longitude coordinates for the two municipalities. The Census Bureau provides the coordinates for an internal point that is at or near the geographic center of the entity. Therefore, while every municipality in Pennsylvania has at least one neighbor, there is no guarantee that every municipality will also have at least one other municipality whose internal point is within 5 miles of the internal point of that municipality.

As one can observe, there is no evidence suggesting that higher unfunded liabilities translate to lower house prices. To the contrary, in specifications that do not include any fixed effects or those that include school-district fixed effects, we find a positive and statistically significant coefficient on the level of unfunded liabilities. The strongest relationship, and one that persists regardless of the nature of fixed effects included, is the positive relationship between house prices and median household income. House prices are higher by anywhere between 0.3 to 1.2 percent for a 1 percent increase in household income. Prices are also higher for houses built more recently with a house that is a year older selling for about 0.3 percent less.

The second set of results rely on identifying all municipalities that lie within a 5-mile radius of a given municipality and matching them up. The most credible identification in this setting comes from examining the relationship between house prices and unfunded liabilities only for municipalities that lie within a 5-mile radius of a given municipality. For example, take Franklin City in Venango County which gets paired up with three other municipalities - Sandycreek Township, Sugarcreek Borough, and Polk Borough. Our identification comes from examining house prices in these four municipalities and across all other similar groupings of municipalities. In columns (1) and (2), we do not assign any weights to the matches effectively assigning the same weight to a municipality within 1 mile as to a municipality that just lies within the 5-mile threshold. In columns (3) and (4) we deviate and weight the observations based on the inverse of the squared distance between the two municipalities, thus assigning more weight to municipalities that are geographically closer.

[Table 3 about here.]

We observe across all columns of Table 3 that there is no statistically significant relationship between house prices and the level of unfunded liabilities per capita. As before, we find that house prices are higher in places with higher household income, although the coefficients are noticeably smaller compared to what we observe in the previous table.

As a robustness check, in Table 4 we estimate regressions for municipalities which get matched with more than 10 municipalities (in cols. (1) and (2)), more than 15 municipalities (in cols. (3) and (4)), and more than 20 municipalities (in cols. (5) and (6)). The number of municipalities which get included in the estimation progressively drops but the identification possibly becomes more compelling. Regardless of the threshold we impose in terms of the minimum number of matches for a municipality, we fail to find a significant negative relationship between house prices and unfunded liabilities.

[Table 4 about here.]

In a similar vein, we perform another robustness check and examine how our results change when we impose a different threshold for geographical proximity. In columns (1) and (2) of Table 5, we only include matched municipalities that lie within 3 miles of each other (as opposed to 5 miles in the base specification) whereas in columns (3) and (4), we include matched municipalities that lie within 10 miles of each other. As before, regardless of the distance we impose for matching municipalities, we fail to find a statistically significant relationship between house prices and the unfunded pension obligations of those jurisdictions.

[Table 5 about here.]

6 Conclusions & Outline of next steps

Based on the analysis conducted in the paper thus far, there does not appear to be any evidence that suggests that unfunded pension obligations are being capitalized into house prices. Obviously much more work remains to be done. One aspect of the data that we would like to explore further has to do with the heterogeneity of effects across time. Given the proliferation of articles regarding public pensions in the media, the decision by credit-rating agencies to incorporate unfunded pension obligations into bond ratings, and recent revisions by GASB to the reporting and measurement of pension obligations by local governments, it is possible that the effects of unfunded pension obligations are not uniform across time, with perhaps some capitalization in recent years.

There are also a number of challenges with the empirical analysis presented here. As pointed out by Healey, Hess, and Nicholson (2012), variation in the interest rates used by pension plans to discount future liabilities contributes to the wide variation in the estimates of unfunded liabilities at the state level. In our sample, interest rates chosen by local pension plans vary between 5.5 and 8.0 percent with a median of 7.0 percent (Bagchi, 2016) and this variation in interest rates is likely to drive some of the variation in the size of unfunded pension obligations. Thus ideally one would like to unskew the reported actuarial liabilities to a common set of assumptions. However, we do not know the interest rate that were used by local governments for the entire time period for which we have data on pensions, viz. 1985–2011. Instead those data are available for a much shorter period of time in a different dataset provided by the PERC for the period between 2003 and 2011.

Another empirical challenge that is likely to be of concern in this context is the presence of other post-employment benefits (OPEB), primarily healthcare benefits promised to public-sector employees and their retirees. Although these obligations do not carry the same contractual obligations as pensions, governments may feel induced to honor these benefits except under unusual fiscal stress.

Therefore not accounting for these benefits (and the future tax obligations that may be required to meet these commitments) may lead us to overstate the impact of pensions on house prices if, as seems reasonable, jurisdictions with large unfunded pension obligations also have large unfunded OPEBs.

In terms of further work using the data, we can exploit the richness of the data available through the Decennial Censuses and the ACS to split the sample in various potentially interesting ways. For example, we can differentiate the effects based on the proportion of residents in a municipality who are homeowners versus the proportion of residents who are renters because from the stand-point of a municipality's political economy, it may matter whether the median voter is a homeowner or a renter. Likewise, given that knowledge of unfunded pension obligations is likely to be influenced by a person's education level, one can split the sample based on the proportion of college graduates in a municipality. As Bagchi (2016) notes, although pensions are more generous and underfunded in jurisdictions that have high levels of political competition, these effects are dampened when a higher than average proportion of voters have a college (or higher) degree. We might be able to similarly examine the heterogeneity of capitalization effects across municipal jurisdictions based on the levels of voter knowledge or awareness regarding municipal pensions.

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Table 1: Summary Statistics

Across all years of the sample	Minimum	p25	Median	Mean	p75	Maximum
Median house price in a municipality	$26,512	$87,428	$121,505	$140,083	$168,145	$898,000
Number of rooms in the median structure	1	5.6	6	5.94	6.1	9.1
Year in which median structure built	1934.5	1944.5	1959	1958.5	1972	1994.5
Unfunded liabilities per capita	($915.13)	($37.93)	$0	($1.29)	$11.16	$3,257.23
Median household income	$18,671	$41,676	$51,357	$54,986	$63,500	$223,375
For 1990 Census & 1989 pension data:						
Median house price in a municipality	$30,979	$75,381	$105,155	$126,879	$155,409	$701,493
Number of rooms in the median structure	1	5	6	5.80	6	9
Year in which median structure built	1939	1939	1954	1954.4	1966	1986
Unfunded liabilities per capita	($282.62)	($39.66)	($8.95)	($4.40)	$0	$1,335.65
Median household income	$19,722	$40,494	$50,726	$54,083	$63,234	$223,375
For 2000 Census & 1999 pension data:						
Median house price in a municipality	$26,512	$90,898	$119,761	$131,317	$156,459	$813,377
Number of rooms in the median structure	3.6	5.6	5.9	5.93	6.1	9.1
Year in which median structure built	1939	1944	1959	1958.6	1972	1994
Unfunded liabilities per capita	($845.75)	(68.76)	($8.86)	($42.54)	$0	$899.68
Median household income	$18,671	$43,474	$53,036	$56,507	$64,934	$198,825
For 2007 - 2011 ACS & 2009 pension data:						
Median house price in a municipality	$33,200	$94,900	$140,050	$158,645	$191,650	$898,000
Number of rooms in the median structure	3.9	5.7	6	6.06	6.3	8.4
Year in which median structure built	1934.5	1944.5	1964.5	1961.8	1974.5	1994.5
Unfunded liabilities per capita	($915.13)	($1.90)	$0.94	$39.00	$64.65	$3,257.23
Median household income	$20,199	$40,974	$50,714	$54,310	$61,979	$194,219

Notes: Data on median house prices and characteristics of the median structure are from the Decennial Censuses of 1990 and 2000 and the 2007 - 2011 5-year ACS. Unfunded liabilities per capita are constructed by normalizing the difference between actuarial liabilities and actuarial assets across all plans with the municipal population. The number of rooms in the median structure for a municipality is unavailable in the 1990 Decennial Census and is constructed based on underlying information. The year of construction for the median structure is unavailable in the 2007 - 2011 ACS and is also constructed based on underlying information (e.g. information on how many structures were built post-2005, the number built between 2000 and 2004, between 1990 and 1999, etc.)

Table 2: Variation of house prices with the size of unfunded liabilities across all municipalities (using data from Decennial Censuses of 1990, 2000, and 2007 - 2011 ACS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Unfunded liabilities per capita	137.2**	39.17	67.99**	20.30	86.37*	38.17	71.68**	21.74
	(60.26)	(42.62)	(32.79)	(54.93)	(48.26)	(42.36)	(32.13)	(56.80)
Number of rooms in the	-0.0703**	-0.0320*	0.00135	0.0193	-0.0512	-0.0336*	-0.00124	0.0168
median structure	(0.0306)	(0.0179)	(0.0162)	(0.0163)	(0.0307)	(0.0179)	(0.0157)	(0.0137)
Year in which median structure built	0.314***	0.334***	0.417***	0.254**	0.650***	0.438***	0.466***	0.255***
	(0.113)	(0.0751)	(0.0661)	(0.0967)	(0.112)	(0.101)	(0.0833)	(0.0804)
Log of median household income	1.245***	0.911***	0.637***	0.293***	1.124***	0.925***	0.651***	0.288***
	(0.0968)	(0.0721)	(0.0695)	(0.0454)	(0.0852)	(0.0698)	(0.0677)	(0.0456)
Log of population density					0.0484***	0.0162**	0.00767	-0.00968
					(0.0102)	(0.00696)	(0.00643)	(0.0554)
Population growth between two decades					0.134**	-0.00349	-0.000934	0.0367
					(0.0542)	(0.0308)	(0.0237)	(0.0275)
Constant	-7.624***	-4.605***	-3.446***	3.371*	-13.31***	-6.892***	-4.603***	3.476**
	(1.577)	(1.085)	(0.979)	(1.854)	(1.945)	(1.715)	(1.496)	(1.482)
Nature of fixed effects introduced	None	County	School district	Municipality	None	County	School district	Municipality
N	4163	4163	4163	4163	4160	4160	4160	4160
R^2	0.77	0.88	0.92	0.97	0.80	0.88	0.92	0.97

Standard errors clustered by county in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Notes: For ease of presentation, unfunded liabilities per capita have been rescaled by dividing them with 1,000,000 and the year in which median structure built divided by 100. Year fixed effects are included in all columns but have not been reported.

Table 3: Variation of house prices with the size of unfunded liabilities comparing municipalities within a 5-mile radius (using data from Decennial Censuses of 1990, 2000, and 2007 - 2011 ACS)

	(1)	(2)	(3)	(4)
Unfunded liabilities per capita	9.211	3.753	23.05	14.24
	(29.91)	(25.77)	(40.86)	(32.97)
Number of rooms in the median structure	-0.00207	-0.000978	-0.00485*	-0.00297
	(0.00187)	(0.00366)	(0.00276)	(0.00487)
Year in which median structure built	0.00130	0.0148	0.00639	0.0193
	(0.0137)	(0.0225)	(0.0181)	(0.0351)
Log of median household income	0.0167*	0.0176*	0.0196*	0.0235
	(0.00960)	(0.0101)	(0.0115)	(0.0156)
Log of population density		0.00353***		0.00619***
		(0.00111)		(0.00157)
Population growth between two decades		0.0189		0.0359
		(0.0149)		(0.0317)
Constant	11.43***	11.16***	11.22***	10.91***
	(0.175)	(0.368)	(0.260)	(0.622)
N	33452	26244	29214	22007
R^2	0.97	0.97	0.97	0.97

Standard errors clustered by county in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Notes: For ease of presentation, unfunded liabilities per capita have been rescaled by dividing them with 1,000,000 and the year in which median structure built divided by 100. Year fixed effects are included in all columns but have not been reported. Regressions are unweighted in columns (1) and (2) but they have been weighted by the inverse of the squared distance in columns (3) and (4).

Table 4: Robustness Checks: Variation of house prices with the size of unfunded liabilities comparing municipalities within a 5-mile radius (using data from Decennial Censuses of 1990, 2000, and 2007 - 2011 ACS)

	(1)	(2)	(3)	(4)	(5)	(6)
Unfunded liabilities per capita	37.43	30.58	55.72	47.90	81.82	72.22*
	(32.63)	(26.39)	(47.05)	(37.18)	(50.57)	(36.23)
Number of rooms in	-0.00242	0.00178	-0.000940	0.00604	-0.00182**	0.00938**
the median structure	(0.00146)	(0.00322)	(0.00164)	(0.00401)	(0.000544)	(0.00358)
Year in which median structure built	-0.00960	-0.0174	-0.0109	-0.0323	-0.0198	-0.0465
	(0.0166)	(0.0275)	(0.0201)	(0.0357)	(0.0238)	(0.0257)
Log of median household income	0.0146	0.00877	0.0103	-0.00191	0.0104	-0.00623**
	(0.0108)	(0.00902)	(0.0101)	(0.00422)	(0.00764)	(0.00235)
Log of population density		0.00189		0.00223		0.00366***
		(0.00117)		(0.00138)		(0.000504)
Population growth between		0.0503		0.111		0.127*
two decades		(0.0394)		(0.0718)		(0.0648)
Constant	11.58***	11.78***	11.56***	12.08***	11.80***	12.43***
	(0.227)	(0.501)	(0.307)	(0.700)	(0.417)	(0.505)
Limited to municipalities with at least	10 matches		15 matches		20 matches	
N	15852	13304	10254	8619	5549	4776
R^2	0.97	0.97	0.97	0.97	0.97	0.97

Standard errors clustered by county in parentheses * p < 0.10, ** p < 0.05, *** p < 0.01.
Notes: For ease of presentation, unfunded liabilities per capita have been rescaled by dividing them with 1,000,000 and the year in which median structure built divided by 100. Year fixed effects and municipal fixed effects are included in all columns but have not been reported. Only municipalities that get matched with at least 10 other municipalities are included in the estimation in columns (1) and (2). Likewise, columns (3) and (4) only include municipalities with 15 or more matches, while columns (5) and (6) only include municipalities with 20 or more matches.

Table 5: Variation of house prices with the size of unfunded liabilities comparing municipalities within a 3-mile or a 10-mile radius (using data from Decennial Censuses of 1990, 2000, and 2007 - 2011 ACS)

	(1)	(2)	(3)	(4)
Unfunded liabilities per capita	20.75	14.93	9.316	1.859
	(36.92)	(35.27)	(25.21)	(20.02)
Number of rooms in the median structure	-0.00521*	-0.00466	-0.000839	0.000137
	(0.00278)	(0.00504)	(0.00136)	(0.00243)
Year in which median structure built	0.00554	0.0352	-0.00495	-0.000253
	(0.0180)	(0.0292)	(0.00909)	(0.0167)
Log of median household income	0.0278*	0.0364**	0.0114*	0.00780
	(0.0143)	(0.0181)	(0.00661)	(0.00634)
Log of population density		0.00775***		0.000864
		(0.00119)		(0.000833)
Population growth between two decades		0.0359*		0.0138
		(0.0212)		(0.00906)
Constant	11.20***	10.49***	11.63***	11.61***
	(0.217)	(0.459)	(0.117)	(0.281)
Limited to municipalities with at least	3 miles from each other		10 miles from each other	
N	14306	11928	108505	78788
R^2	0.97	0.97	0.97	0.97

Standard errors clustered by county in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Notes: For ease of presentation, unfunded liabilities per capita have been rescaled by dividing them with 1,000,000 and the year in which median structure built divided by 100. Year fixed effects and municipal fixed effects are included in all columns but have not been reported. Columns (1) and (2) impose the requirement that matched municipalities be within 3 miles of each other while columns (3) and (4) impose the requirement that matched municipalities be within 10 miles of each other.