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The Impact of Taxes and HOA Fees on Single-Family Home Prices

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Abstract This empirical study utilizes a hedonic pricing model and a large dataset to investigate how property taxes and homeowners association (HOA) fees were capitalized into the real price of single-family homes from 2002 through 2013 in Duval County, Northeast Florida. The findings suggest that the real price was negatively impacted by real city and county property taxes, but positively affected by membership in an HOA. These findings are consistent with earlier research and have implications for government policy makers, real estate developers and civic groups, both regionally and nationally.

Keywords Housing prices · Property tax capitalization · Homeowners associations · Market mechanism

JEL Classifications R14 · R13 · R11

Introduction

Over the last quarter century, hedonic pricing models have been used in a number of studies to assess the impacts of various factors on property values (Hughes and Sirmans

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1992; Asabere and Huffman 1994; LaCour-Little and Malpezzi 2009). The effects of property taxes on property values were first studied by Tiebout (1956), Tullock (1971) and Oates (1969). More recent studies include Cebula (2009a), Cebula (2009b) and Coombs et al. (2011). The impact of homeowner associations (HOAs) and neighborhoods has been less studied. The improvements in the ability of homeowners to organize and influence local decisions were studied by Glaeser et al. (2005), and the effects of impact fees were studied by Singell and Lillydahl (1990), and Skidmore and Peddle (1998). Since the 2007–2008 recession, the declines in both income and property values have made home buyers, especially those buying in the lower end of the price spectrum, even more averse to high HOA fees. An HOA is responsible for maintaining the neighborhood's streets, landscaping and other amenities. The premise is that local residents can manage their neighborhood better than the various divisions of government.

In a recent study, Meltzer and Cheung (2014) explore the value of membership, as capitalized into housing values, in homeowners associations in Florida. We extend this nascent stream of inquiry by investigating how property taxes and HOA fees are capitalized into real housing prices of single-family homes in the northeast Florida housing market from 2002 through 2013. Within the context of the hedonic pricing model, this study considers a large dataset containing 123,431 single-family home sales in Duval County, Florida ranging from $10,000 to $3.5 million. Duval County is northeast Florida's largest county, containing the city of Jacksonville, the largest city in landmass in the U.S. and a city that has not been formally studied. The sharp decline in state and local tax revenues in the recession of 2007–2008 meant that government spending programs had to be cut. City and county governments tried to find new sources of revenue by imposing higher tax rates, and were forced to use a pro-cyclical approach (spend less during a recession), which magnified the business cycle. This analysis considered a number of other factors potentially influencing the housing market, such as a series of interior and exterior characteristics and spatial considerations.

Theoretical Framework

This section provides the framework for the hedonic pricing model as applied to housing sales in Duval County, Florida. Tiebout (1956) hypothesized that "…the consumer-voter may be viewed as picking that community which best satisfies his set of preferences for public goods…the consumer-voter moves to that community whose local government best satisfies his set of preferences…" Furthermore, as Tullock (1971) observes, "… an individual deciding where to live will take into account the private effects upon himself of the bundle of government services and taxes…" Hence, Tullock (1971) emphasizes that the homebuyer evaluates the tax burden at potential locations of choice. An analysis by Oates (1969) investigated a number of studies considering whether property taxes are capitalized into housing prices.

Meltzer and Cheung (2014) explore the value of membership in homeowners associations as capitalized into housing values. They draw from theories on property tax capitalization and land use regulation to conceptualize the impact of HOAs on property values. On the one hand, the traditional view on property tax capitalization

implies that the HOA fee will lower the present value of the property and the underlying land. According to this perspective, the presence of an HOA decreases property and land value. On the other hand, the benefit view of property tax capitalization predicts that the amenities provided using the property tax revenues would increase the value of the home. Arguably, in the case of HOAs, more directly than property taxes, any negative capitalization of the HOA fee should be compensated by benefits associated by the HOA amenities and services provided to members (Meltzer and Cheung 2014). Theoretically, this leads to an overall ambiguous net effect of HOAs on property values.

The hedonic pricing model suggests that a single-family home constitutes a bundle of attributes to utility-maximizing consumers. The market value of the home is revealed through a market transaction at the acquisition date (i.e., the sales price of the home at closing). The hedonic pricing model decomposes the transaction price into various components, such as interior and exterior features, other characteristics of the house, such as community features and location (spatial considerations) that affect the final sales price. The estimated parameters of the model provide information about the relative contribution of any given house feature.

In this study, the hedonic pricing model takes the following general form:

LNRSPj	*F* (*Ij*, *Ej*, *Oj*)
LNRSPj	The natural log of the real price of house *j*, where the price of the j^{th} house is expressed in 2005 dollars
Ij	A vector of interior physical characteristics for house *j*
Ej	A vector of external physical characteristics for house *j*; and
Oj	A vector of other factors associated with house *j*, including property taxes, HOA fees, and spatial control variables.

In the typical hedonic model applied to real housing prices, the interior and exterior physical characteristics of house *j* include the following: *sqft heated*, the total listed number of square feet of finished or heated interior living space and either *total bathrooms*, the listed number of full baths and half baths, or *total bedrooms*, the listed number of bedrooms, or both. As observed in Sirmans et al. (2005), and based on a variety of other studies, including Laurice and Bhattacharya (2005), and Cebula (2009a), the real sales price is expected to be an increasing function of the number of desirable internal and external physical housing characteristics. For example, the *real sales price* is expected to be an increasing function of square footage of finished living space and the number of bathrooms.

The exterior physical characteristics of house *j* include the following: *number of stories*, the number of stories in the house structure, *additional sqft 1*, the total listed number of square feet of unheated living space (the difference between total square feet and heated square feet), *additional sqft 2*, the total listed number of parcel square feet minus heated and unheated square feet. The *real sales price* of house *j* is expected to be an increasing function of the above characteristics, except the *number of stories*, for which one might expect a negative effect.[1] Another factor associated with house *j* is

[1] For some homebuyers, a one-story home without stairs to climb is the only type of home they would buy. This preference is even more pronounced in the Northeast Florida housing market, characterized by a large population of retiree buyers.

actual age, the number of years since construction (year of sale minus year built). Older homes may have a higher likelihood of needing repair and more imperfectly match modern preferences. As suggested in Sirmans et al. (2005) and Laurice and Bhattacharya (2005), the age of a house is expected to adversely influence its sales price, i.e., *real sales price* is a decreasing function of *actual age*, ceteris paribus. Several studies (e.g., Grether and Mieszkowski 1974) have accounted for a nonlinear effect of age on housing prices, to reflect the fact that younger houses depreciate more rapidly than older ones. This paper includes both *actual age* and *actual age squared* to test for nonlinear effects.

The third category of factors considered in this study is the property tax variable, *total taxes*, which is defined as the previous year's annual city plus county property tax liability associated with house *j*. This study hypothesizes that residential property taxes are capitalized into housing prices such that housing prices are expected to be a decreasing function of property taxes, *ceteris paribus* (Cebula 2009b).

The impact of HOA fees represents an ambiguous effect due to the fact that private HOAs levy binding fees and provide local services to members. If both are capitalized into the value of member properties, the net effect could be negative, positive or zero, depending on the relative size of each effect. Assessments for services that homeowners do not want reduce property values because the marginal purchaser of property feels the cost exceeds the benefit. The presence of amenities and services in HOA subdivisions comes with mandatory HOA fees that homeowners must pay monthly, quarterly, semi-annually, or annually. These fees may be capitalized into the real price of the home. A higher HOA fee would afford better services, such as landscaping, which in turn would positively affect the sales price. In addition, for families who use the community pool or spa, its presence commends a higher sales price. The same hypothesis can be made for beach access, the presence of a bulkhead, or the sense of security derived by a gated community. This study hypothesizes that some community features are used extensively and enjoyed by the majority of homeowners, or considered advantageous in the event of a future re-sale. These features are capitalized into housing prices. Housing prices are expected to be an increasing function of these community features. To the extent that a considerable number of homeowners do not use, and thus derive no value from use of a tennis court, or golf course, or RV or boat parking facility, paying more in HOA fees for such amenities is capitalized into housing prices, as a decreasing function of these community features.

In addition, there are two spatial control variables included in the model: *ZIP code* and *waterfront*. Both variables are binary variables. A total of 31 different ZIP codes are found in our data set ranging from ZIP code 32202 to ZIP code 32277, separating Duval County into 31 separate geographic areas. It is expected that geographic areas near the beaches would have a higher price due to this desired location. In addition, it is hypothesized that waterfront houses, *waterfront* (=1 or 0) command a higher price due to their desirable location.

Control variables for annual periods are present in the form of year fixed effects *y02* (for year 2002) thru *y13* (for year 2013). Given that 2002–2013 encompasses a period of economic recovery and expansion thru 2006, followed by the recession in 2007–2008 and a significant drop in both average household income and employment rates after 2008, we expect that *y03* thru *y06* will have a positive effect on the real sales price,

and *y08* thru *y13* will have a negative effect on the real sales price, omitting *y02* in our empirical specifications to avoid multicollinearity.

The Data

Applying the hedonic pricing model to home sales within Duval County, Florida over the 12 years period from 2002 through 2013, data for 123,431 home sales for which there was sufficient information for analysis were obtained from the Northeast Florida Association of Realtors' Multiple Listing Service. In order to permit comparison of sales prices across the study period, all housing prices, property taxes for the previous year and HOA fees prior to the date of sale were converted to and expressed in 2005 dollars using the price index for single-family homes from the U.S. Census Bureau. There were a variety of interior and exterior physical characteristics available for each house sold, as well as other associated factors that were available and expressly included in the analysis. For each of the impacts of the explanatory variables on housing price in the model, the expected sign is proffered in the discussion provided below under the assumption of *ceteris paribus*.

The dataset utilized is large and varied in the types of houses included. The average house has 1,797 square feet of living or heated space (standard deviation, SD of 721). The average actual age of the house was 30 years (SD of 24.5). The average house has two bathrooms (SD of 0.72) and sold for $180,064 (SD of 196,750). Total taxes for the average house in the previous year were $2,156 (SD of 2,150), and the property tax millage rate ranged from 16.53 to 20.54 mills (1.653 to 2.054 % of assessed tax value). Forty-eight percent (48 %) of houses sold in our dataset paid an annual HOA fee ranging from $120 to $12,960. All monthly, quarterly and semi-annual fees were converted into annual fees. Annual HOA fees for the average house were $;335.93 (SD of 742.02). About 15 % of all sales occurred in year 2007, followed by 12 % in 2013, 10 % in 2005, 9 % in 2006, 8 % in 2004 and 2012, and 7 and 6 % in the remaining years. ZIP codes that had a larger number of sales include: ZIP code 32244 (8 %), ZIP code 32218 (8 %), ZIP code 32225 (7 %), and ZIP code 32210 (7 %) Table 1.

Empirical Findings

This section presents the results of the estimated hedonic model. A semi-log specification was employed with the *real sales price* of each home expressed in natural log form, *ln real sales price* as the dependent variable and the White (1980) procedure adopted to correct for heteroskedasticity, with robust standard errors shown in Table 2 and Table 3. Numerous alternative versions of this specification yield a pattern of very consistent results, in terms of both coefficient size and t-value. Two groups of specifications that were investigated differ on the tax variable used: the previous year's *total tax* (Specifications 1 and 2) versus the *tax rate* (Specifications 3 and 4).

Specifications 1 and 3 used *actual age*, and the binary variable for the presence of the HOA fee, *association fee binary*. Specifications 2 and 4 used both *actual age* and *actual age squared*, and the continuous variable for the HOA fees, *association fee annual*. Most of the estimated coefficients in all specifications are statistically significant with the expected sign at the 1 % level. The coefficients of determination indicate

Table 1 Summary statistics

Variable	Mean	Std. Dev.	Min	Max
sales price	180,064.40	196,750	10,000	3,500,000
ln real sales price	11.79	0.81	9.21	15.068
sqft heated	1,797.18	721.24	500	9,276
additional sqft 1	492.45	332.33	0	8,081
additional sqft 2	13,960.63	60,587.11	0	7,179,612
total bathrooms	2.11	0.72	0.5	8
waterfront	0.14	0.35	0	1
actual age	30.30	24.55	0	131
actual age squared	1,520.64	2,085.88	0	17,161
number of stories	1.26	0.45	1	4
total taxes	2,156.07	2,149.53	100.12	20,978
tax rate	19.20	0.17	16.53	20.54
association fee annual	335.93	742.02	0	12,960
association fee binary	0.48	0.50	0	1
zip32202	0.00	0.03	0	1
zip32204	0.01	0.08	0	1
zip32205	0.04	0.19	0	1
zip32206	0.02	0.14	0	1
zip32207	0.03	0.18	0	1
zip32208	0.04	0.18	0	1
zip32209	0.03	0.16	0	1
zip32210	0.07	0.25	0	1
zip32211	0.03	0.17	0	1
zip32216	0.03	0.18	0	1
zip32217	0.02	0.13	0	1
zip32218	0.08	0.27	0	1
zip32219	0.02	0.13	0	1
zip32220	0.02	0.12	0	1
zip32221	0.04	0.19	0	1
zip32222	0.02	0.13	0	1
zip32223	0.03	0.17	0	1
zip32224	0.04	0.20	0	1
zip32225	0.07	0.26	0	1
zip32226	0.03	0.17	0	1
zip32233	0.02	0.15	0	1
zip32234	0.00	0.07	0	1
zip32244	0.08	0.26	0	1
zip32246	0.05	0.23	0	1
zip32250	0.03	0.16	0	1
zip32254	0.02	0.13	0	1
zip32256	0.03	0.17	0	1

Table 1 (continued)

Variable	Mean	Std. Dev.	Min	Max
zip32257	0.04	0.19	0	1
zip32258	0.05	0.23	0	1
zip32266	0.01	0.09	0	1
zip32277	0.03	0.16	0	1
y02	0.06	0.23	0	1
y03	0.07	0.26	0	1
y04	0.08	0.27	0	1
y05	0.10	0.30	0	1
y06	0.09	0.29	0	1
y07	0.15	0.36	0	1
y08	0.06	0.23	0	1
y09	0.06	0.24	0	1
y10	0.07	0.25	0	1
y11	0.07	0.25	0	1
y12	0.08	0.28	0	1
y13	0.12	0.32	0	1

that from 69 to 75 % of the variation in the dependent variable was explained by the model, and the F-statistic was significant at the one percent level for all specifications, serving as evidence of the overall strength of the model.

Before discussing the impact of taxes and HOA effects, a discussion of a few of the standard variables seems in order to test the reasonableness of the model in all specifications. For example, with respect to the interior features of house *j*, the presence of an additional bathroom causes the real sales price of house *j* to increase by 5 to 6 %, depending upon the specification being considered. This is reasonable and consistent with the literature.

The variable *sqft heated* is measured in square footage. To find the effect of the coefficient on the real sale price of house *j*, we multiply the coefficient (0.0004) by the average sales price ($180,064 – Table 1) to get $72.02. This suggests that the real housing price rises by roughly $72 (in 2005 dollars) for each additional square foot of finished living space, which lies roughly in the upper range compared to recent similar studies (e.g., Coulson and Leichenko 2001; Bin and Polasky 2004; Cebula 2009B).

With respect to age, our results are in line with previous studies and indicate that as houses get older, they lose less value. In the first year, the average house will depreciate by 0.14 %. Throughout the first decade, it will depreciate about 0.5 %, with depreciation ending at year 15. At year 20, our average house will experience a 10 % appreciation, and at year 30, it will experience a 4.5 % appreciation, *ceteris paribus*.

The estimated coefficient on the property tax variable is negative, as expected, and statistically significant at the 1 % level. This finding provides strong empirical support for the hypothesis that a higher property tax amount or rate reduces the price of housing, presumably because the property tax liability is capitalized into the housing price (Oates 1969). The mean property tax for a single-family home in the northeast

Table 2 OLS regression results

	Specification 1		Specification 2	
Variable	Coef.	*T*-value	Coef.	*T*-value
constant	10.92	481.86	10.92	485.06
sqft heated	0.0004	105.71	0.0004	101.93
additional sqft 1	0.0003	42.16	0.0003	42.29
additional sqft 2	1.21E-06	45.78	1.3E-06	47.94
total bathrooms	0.051	13.09	0.06	14.57
waterfront	0.11	22.41	0.096	20.55
actual age	−0.005	−54.22	−0.015	−56.83
actual age squared			0.0001	40.16
number of stories	−0.015	−3.53	−0.046	−10.68
total taxes	−3.87E-06	−4.31	−3.62E-06	−4.05
association fee annual			0.00001	5.59
association fee binary	0.124	15.23		
zip32206	−0.59	−26.93	−0.60	−27.22
zip32250	0.47	21.51	0.67	30.4
zip32266	0.57	21.62	0.79	29.47
y03	0.09	10.46	0.09	10.16
y04	0.21	24.62	0.21	24.11
y05	0.40	48.33	0.40	47.8
y06	0.49	57.9	0.48	57.38
y07	0.44	56.81	0.43	55.56
y08	0.30	32.55	0.29	30.85
y09	0.11	11.8	0.09	10.19
y10	0.05	6.07	0.04	4.19
y11	−0.08	−8.36	−0.09	−9.68
y12	−0.04	−5.14	−0.06	−6.79
y13	0.01	1.27	0.003	−0.31
Observations	123,431		123,431	
R-squared	0.69		0.71	
Adj R-squared	0.68		0.7	

Florida housing market is $2,156, with a standard deviation of $2,150. Raising the property tax liability by one full standard deviation would reduce the real price of the average house by approximately $14,000.

The mean property tax rate for a single-family home in the northeast Florida housing market is 19.20 mills, with a standard deviation of 0.17. In specifications 3–4, raising the property tax rate by one mill (from 19.2 to 20.2) would reduce the real price of the average house by 3 %, which translates to a dollar decrease of $5,402.

By contrast, regarding the effect of HOA fees, the findings are consistent with the recent study by Meltzer and Cheung (2014), who find that properties in HOAs sell at a premium just under 5 %. Our premium for properties in HOAs compared to properties

Table 3 OLS regression results

	Specification 3		Specification 4	
Variable	Coef.	*T*-value	Coef.	*T*-value
constant	11.45	48.38	11.45	48.71
sqft heated	0.0004	105.93	0.0004	102.14
additional sqft 1	0.0003	42.31	0.0003	42.45
additional sqft 2	0.000001	44.36	0.000001	46.47
total bathrooms	0.05	13.17	0.06	14.65
waterfront	0.11	22.38	0.10	20.53
actual age	−0.01	−54.09	−0.01	−56.93
actual age squared			0.0001	40.32
number of stories	−0.02	−3.61	−0.05	−10.79
tax rate	−0.03	−2.28	−0.03	−2.30
association fee annual			0.00001	5.59
association fee binary	0.125	15.88		
zip32206	−0.59	−26.98	−0.60	−27.28
zip32250	0.49	20.90	0.69	29.31
zip32266	0.57	21.73	0.79	29.62
y03	0.09	10.67	0.09	10.35
y04	0.22	24.83	0.21	24.31
y05	0.40	48.56	0.40	48.03
y06	0.49	58.03	0.48	57.51
y07	0.44	56.78	0.43	55.53
y08	0.30	32.34	0.28	30.67
y09	0.10	11.41	0.09	9.82
y10	0.05	5.60	0.03	3.76
y11	−0.08	−8.96	−0.09	−10.27
y12	−0.06	−6.50	−0.07	−8.15
y13	0.003	−0.41	−0.02	−2.01
Observations	123,278		123,278	
R-squared	0.71		0.72	
Adj R-squared	0.7		0.71	

without HOAs is larger, at 12.4 %, but given the differences in the periods of study between the two datasets, we cannot directly compare these premiums. In specifications 2 and 4, the variable for the HOA effect is the annual dollar amount paid in HOA fees. For a one-dollar increase in HOA fees the average home value goes up by about $1.80.

Conclusions

In this study, the hedonic pricing model is applied to the housing market in Duval Country, northeast Florida. The two main objectives were to investigate whether and to

what extent the property taxes and HOA fees are capitalized into real housing prices. The study period, which runs from 2002 through 2013, includes one of the fastest growth periods in the real estate market (2002–2006) and also one of dramatic declines in property values (2009–2012). The principal findings of this study include the result that the natural log of the real sales price of a single-family house in Duval County from 2002 to 2013 period was negatively impacted by higher property taxes. This finding affirms the free market system's efficiency in assessing the impacts of governmental actions and policies, which is consistent with the Tiebout (1956) hypothesis and the empirical study by Oates (1969). Furthermore, the implications of this finding in the post-recession period relate to how higher property tax policies reduce the net wealth of homeowners, which induces a reduction in consumer spending.

Second, consistent with Meltzer and Cheung (2014), we found that the natural log of the real sales price of a single-family house in Duval County was positively impacted by membership in HOAs. In an economic climate where state and local government is struggling to keep taxes low, yet provide necessary services, our results have public policy implications. Where localities can encourage HOA communities, there is a two-fold benefit for local government. Government expenditures in the jurisdiction will be lower, in equilibrium, due to off-loading the costs to the HOAs. Second, with home values increasing in the HOAs, the property tax base will be increasing, thereby providing marginally higher tax revenues in the future. HOAs also provide the obvious benefit to the homeowner of higher property value over time and a better real estate investment. Last, HOAs yield the added benefit of providing a higher level of services and a larger degree of control over local land use. It is not surprising that there has been a huge increase in HOA communities across Florida in the last three decades.

One question is whether these results are generalizable to other geographic areas. North Florida is somewhat unique because of the pleasing moderate climate. The climatic impact is partially responsible for the net immigration experienced in the area over the last 20 years. This obviously increases housing demand. Moreover, the area is increasingly attractive to retirees, who are attracted to the comfortable living provided by HOA developments. Lastly, the net immigration and attractiveness of the area is also influenced by the lack of a state income tax in Florida.

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