

## **The Housing Price Premium Associated with Charter Schools**

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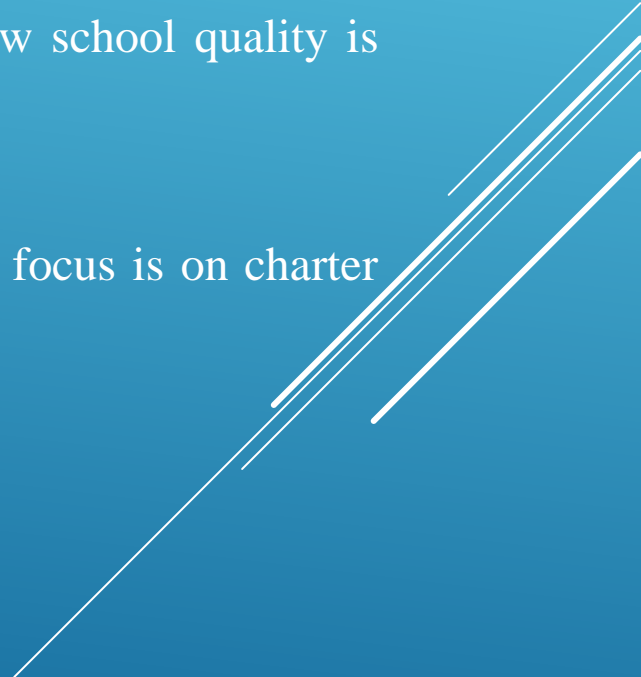
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## Overall Context

1. School quality and housing have been shown to be related in much of the existing literature. However, even such a broad statement is open to debate. This is due to methodology, data, classification of variables, small sample sizes, jurisdictional issues, type of school investigated, demographics, school quality signal and the complexity of residential price modeling.
  2. There are some very good studies while the question continues to arise as to how school quality is signaled to the market and what measures are related to school quality.
  3. Our research addresses some of these issues, but also has similar limitations. The focus is on charter schools.
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## General Abstract and Findings

1. The existing real estate literature documents a clear relation between public school quality and a residential real estate price premium.
2. The literature on whether the availability and quality of charter schools are associated with a price premium, however, is thin even as the choice, charter school, and home school movements have expanded.
3. The present extension examines whether, and to what extent, the quality of charter schools in Florida's two most populous counties is associated with a price premium. There are over 600 charters schools in the state and about 250 in the study area. Florida is a leader in the choice/charter school arena.
4. We provide evidence that residential real estate price premiums are associated primarily with charter quality (relative) and not just availability.

5. The price premium is smaller than that of quality public schools, but is potentially economically meaningful, especially when the quality of charter schools exceeds the quality of public schools in the area and for family-oriented housing types. The major comparison includes controlling for zoned school quality and type of housing unit.

6. We show that the premium associated with quality charter schools varies with school type and is the highest for high schools. Few studies of school quality focus on type of school. Few even mention the hierarchical nature of school assignments: elementary feeds middle which feeds high schools.

## Back Tracking: What is a Charter School?

We use the definition from State of Florida and Miami-Dade County Public Schools:

“charter schools are tuition-free public schools which operate under a performance contract or “charter” agreement between a governing board and the local public school board. Charters are independent public schools which have more flexibility to innovate and provide a unique curriculum, while remaining accountable for advancing student achievement.” \*

In Miami-Dade County there are 134 charter schools enrolling 68,452 students or 19.6% of county enrollees for the academic year 2018-19. After a period of growth, number of schools has been relatively flat for the last 5 years although enrollment has continued to increase. In the 2009-10 school year there were 30,806 students or 8.9% of system students.

Charter schools have flexibility, but are held to similar student learning outcomes and traditional schools. Students who apply must be enrolled as long as there is capacity.

\*<https://charterschoolsdadeschools.net/>, also see <https://www.browardschools.com/Charter-Schools>

## Basic Literature

Numerous papers show a relationship of school quality and price/value. Issues that arise are related to measurement of quality, interaction of school quality and overall neighborhood amenities and characteristics, modeling issues and depth of data evaluated.

Recent relevant papers for this audience are:

1. Shen and Turner (2018) (*REE*):

Investigation of the tie in ownership to access to premier universities since residency dictates acceptance/enrollment quota.

1. Wen, Xiao, and Zhang (2017) (*REE*):

Another look at the impact of school boundaries and access to quality schools

## Choice and Vouchers

1. Merrifield, King-Adzima, Nesbit and Gunasekara (2011) (*Cato Journal*):

Implementation of a school voucher program can increase property values for homes in underperforming sub-markets.

2. Brunner and Sonstelie (2003) (*Journal of Public Economics*);

Perception of loss in value of quality district homes and increase in lower quality homes.

3. Hwan (2015) (*Reg. Science and Urban Economics*):

Choice program in Seoul, Korea confirms Brunner and Sonstelie (2003)


4. Reback (2005) (*J. of Urban Econ.*) and Cannon, Danielson, and Harrison (2015) (*JHR*):

Benefit to choice impacting house values.

5. Danielson, Harrison and Zhao (*REE*):

Even with choice proximity to a better performing school should be valued since there are costs associated with travel/frictions.

6. Brunner, Cho and Reback (2012) (*J. of Urban Econ.*):  
Investigate the expansion of an inter-district choice program.





## **SO, Again, the Present Study focuses on Charter Schools**

A charter school is a public school where management and operations are ceded to a more local group focused at the school level. The idea is that the more local the control the more accountable and potentially the more successful. In Florida, access is typically open to any student and boundary lines are not relevant.



## The Literature on Charter Schools is Limited

### 1. Horowitz, Keil, and Spector (2009) (*Rev. of Regional Studies*):

An initial study with a small dataset (less than 200 observations) from a single charter using data from Toledo, Ohio.

Results suggest little impact of charter schools on residential property values.

### 2. Brehm, Imberman, and Naretta (2016) (*Ed. Finance and Policy*):

Proxy charter school impact by using estimated charter school slot availability as the salient factor.

Results show no relationship between the availability of charter school slots and housing values.

The study only peripherally addresses school quality.



## The Dataset Used in the Investigation

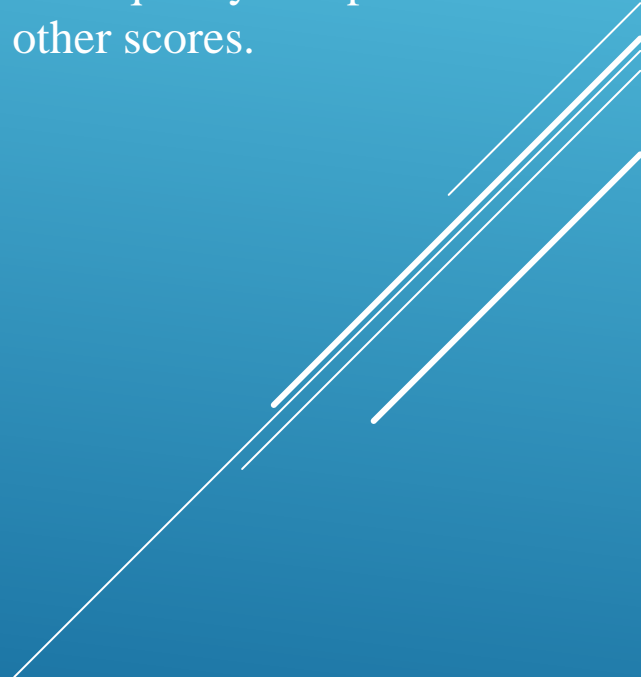
Two major datasets are employed.

1. The first includes information on sales transactions (MLS) for the counties of Miami-Dade and Broward, the two most populated counties in the state of Florida for the 2006 to 2016 period.

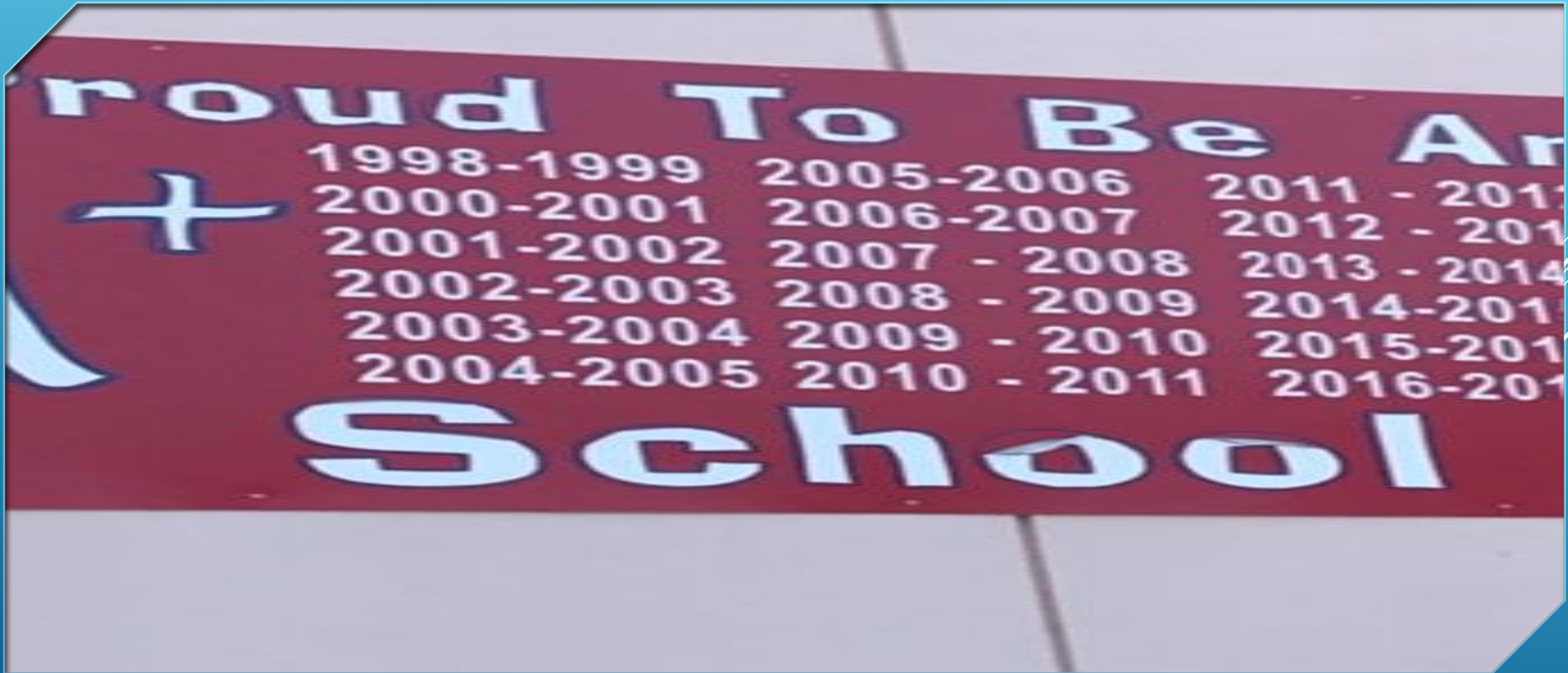
Use of the MLS dataset is important since this dataset contains information on property, neighborhood and school quality used by the brokerage industry in marketing residential property. In short, the brokerage community uses the A to F system in the MLS and the A to F is a recognized signal of quality to the market.

2. The second dataset is from the Florida Department of Education and contains annual information on the quality of public and charter schools. Each public and charter school within the state of Florida earns an annual grade (between A and F) from the Florida Department of Education. The grade is based on up to 11 different learning and outcome components making this measure a very comprehensive school quality indicator.

Again, the annual school grade is heavily used by the real estate industry as a measure of school quality. People (the public) know their school grade. Perhaps a subset of academics and admin people know other scores.



The Grading Scale is Out There! Eagle Point Elementary





## Data Application

The two datasets are merged to match the information from each property's sales transaction with the quality of schools associated with that property.

We identify the public elementary, middle and high school associated with each property as well as the physically nearest charter elementary, middle and high school to each property.

We can observe the public versus charter choices available for each property and the school quality associated with each choice.

There are 219 charter schools in the dataset including 128 schools in Miami-Dade County\* and 91 in Broward County

The large number of charter schools is unique to the literature. The schools include elementary, middle, high and combined schools. We run additional school type only models.

\* Miami-Dade Public School System has an enrollment of about 345,000 students in approximately 394 schools and is the 4<sup>th</sup> largest system in the US. Broward Public School System enrolls approximately 270,00 students in 319 schools. Total student count for the two counties is about 615,000 students To give a relative measure, State of South Carolina total enrollment is about 781,000 students with Wisconsin having about 872,000 students.

## Models Employed

We employ the generalized spatial two-stage least squares (GS2SLS) methodology in our analysis.

The GS2SLS methodology relies on a spatial-weighting matrix that includes the precise distance between each property and all other properties in the sample. The estimation reflects a spatial-autoregressive process that considers the distances between properties and assigns higher weight to properties that are geographically closer and vice versa. As a result, the GS2SLS methodology accounts for spatial autocorrelations that is rooted in neighborhood effects.

$$Price = \alpha_0 + \lambda_1 CSGrade + \lambda_2 PSGrade + \sum_{j=1}^k \beta_j X_j + \sum_{t=2006}^{2016} \mu_t D + \delta WPrice + u \quad \text{and}$$

$$u = \rho Mu$$

*Price* is the natural log of the purchase price of each property.  $\beta_j$  are the coefficients of the vector of  $X_{ji}$ , which includes a set of physical property attributes; the  $\mu_t$  coefficients are of the  $D$  year indicators;  $W$  and  $M$  are spatial-weighting matrices;  $WPrice$  and  $Mu$  are the spatial lags vectors while  $\delta$  and  $\rho$  are the corresponding scalar spatial autoregressive parameters.



We also look at the charter school quality differential (*CSPosDiff*) variable. *CSPosDiff* is defined such that it is set to 0 when the quality of the proximate charter schools is the same or below the quality of the public schools and to the numerical difference between the quality of charter and public schools when the quality of charter schools exceeds the quality of the public schools.

$$Price = \alpha_0 + \lambda_1 CSPosDiff + \lambda_3 PSGrade + \sum_{j=1}^k \beta_j X_j + \sum_{t=2006}^{2016} \mu_t D + \delta WPrice + u$$

Table 1: Descriptive Statistics

Panel A: Physical Characteristics				
	Avg.	SD	Min	Max
Beds	2.71	1.07	0	7
FBath	2.02	0.75	1	7
HBath	0.24	0.44	0	4
SQFT	1632	851	500	10,000
Age (years)	30.79	18.27	0	115.88
Price (\$)	297,569	361,374	30,000	5,000,000
Flat/TH/Single			38.1% / 12.8% / 49.1%	
Broward/Miami Dade			50.16% / 49.8%	
# Observations	<b>502,309</b>			
Panel B: School Quality (4-A, 3-B, 2-C, 1-D, 0-F)				
	Avg.	SD	Min	Max
Charter Schools (all)	3.14	0.98	0	4
Elementary	3.06	1.09	0	4
Middle	3.10	1.07	0	4
High	3.16	0.95	0	4
Public Schools (all)	2.98	0.79	0	4
Elementary	3.25	1.05	0	4
Middle	2.97	1.05	0	4
High	2.70	1.09	0	4

*Note:* The transactions are from a regional MLS database and include data from Florida's Broward County and Miami-Dade County. The 502,309 residential sale transactions are from 2006 to 2016. Each transaction contains a purchase price as well as physical property characteristics. There are 219 charter schools.

TABLE 2: GENERAL RESULTS WITH INITIAL REGRESSION MODELS

Specification	(1)	(2)	(3)	(4)	(5)	(6)
County	Both	Broward	Miami- Dade	Both	Broward	Miami- Dade
CSGrade	0.0422*** [38.9300]	0.0427*** [36.9696]	0.0786*** [24.1005]	0.0144*** [13.8424]	0.0037*** [3.2406]	0.0087** [2.5494]
PSGrade				0.2596*** [230.4636]	0.1952*** [121.5386]	0.2624*** [170.5520]
LivingArea	1.3798*** [344.8627]	1.2887*** [237.1978]	1.4188*** [274.4749]	1.1834*** [301.0212]	1.2002*** [228.9090]	1.2012*** [228.2804]
Age	-0.0888*** [-81.2106]	-0.1532*** [-80.4986]	-0.0618*** [-47.5009]	-0.1300*** [-]	-0.1312*** [-71.7046]	-0.1231*** [-90.0220]
Beds	-0.2017*** [-120.2625]	-0.0685*** [-31.6483]	-0.2624*** [-118.0771]	-0.1686*** [-]	-0.0705*** [-34.0507]	-0.2111*** [-94.9791]
FBath	0.1708*** [86.6564]	0.0687*** [25.9634]	0.2178*** [85.2099]	0.1531*** [80.8322]	0.0766*** [30.2255]	0.1873*** [74.1531]
HBath	0.1161*** [52.5936]	0.0371*** [13.1642]	0.1317*** [44.7598]	0.0880*** [41.1897]	0.0190*** [7.0206]	0.1138*** [38.7155]
Constant	2.7799*** [102.4444]	3.2667*** [89.6239]	1.5950*** [45.6022]	3.5951*** [136.3636]	3.3236*** [95.1067]	3.0175*** [83.4961]
Observations	502,309	251,958	250,351	502,309	251,958	250,351
Adjusted R^2	0.6109	0.7367	0.5938	0.6673	0.7618	0.6477

TABLE 3. REGRESSIONS BY PROPERTY TYPE

Panel A: Single-Family Homes						
Specification	(1)	(2)	(3)	(4)	(5)	(6)
County	Both	Broward	Miami-Dade	Both	Broward	Miami-Dade
CSGrade	0.0480*** [29.3367]	0.0664*** [36.0816]	0.1001*** [19.7081]	0.0226*** [14.5033]	0.0217*** [12.0516]	0.0212*** [8.0821]
PSGrade				0.2718*** [201.3456]	0.1906*** [95.2024]	0.3138*** [165.2004]
LivingArea	1.2359*** [274.9449]	1.1395*** [189.4290]	1.2926*** [205.7510]	1.0359*** [241.0161]	1.0567*** [181.9079]	1.0108*** [165.4306]
Age	0.0727*** [50.3903]	-0.0629*** [-25.8057]	0.1049*** [57.5365]	0.0582*** [41.2188]	-0.0269*** [-11.3485]	0.0664*** [36.1622]
Beds	-0.1120*** [-62.3158]	-0.0512*** [-22.6337]	-0.1561*** [-59.8016]	-0.0980*** [-58.4055]	-0.0576*** [-26.6375]	-0.1196*** [-48.5543]
FBath	0.2049*** [100.7598]	0.1240*** [45.4856]	0.2415*** [85.0801]	0.1892*** [100.0474]	0.1332*** [50.9852]	0.2103*** [79.2889]
HBath	0.1480*** [52.5692]	0.0926*** [27.6859]	0.1697*** [39.7118]	0.1285*** [48.6975]	0.0832*** [25.9164]	0.1612*** [39.7444]
Constant	2.3304*** [74.0296]	4.1986*** [99.0186]	2.1119*** [46.8307]	3.6215*** [122.6238]	4.1431*** [102.1712]	3.7755*** [85.8916]
Observations	246,684	123,737	122,947	246,684	123,737	122,947
Adjusted R^2	0.6628	0.725	0.6471	0.7272	0.7526	0.7248

Panel B: Condominiums and Townhomes

Specification	(1)	(2)	(3)	(4)	(5)	(6)
County	Both	Broward	Miami-Dade	Both	Broward	Miami-Dade
CSGrade	0.0297*** [23.5176]	0.0263*** [18.7025]	0.0605*** [16.2535]	0.0002 [0.0054]	-0.0102*** [-7.2769]	-0.0078** [-2.0858]
PSGrade				0.2802*** [151.6114]	0.2229*** [90.1300]	0.2530*** [117.9911]
LivingArea	1.5428*** [240.3945]	1.4613*** [140.9536]	1.5503*** [200.5603]	1.3322*** [208.5861]	1.3495*** [137.7117]	1.3264*** [166.9574]
Age	-0.1690*** [-112.9562]	-0.2094*** [-71.1835]	-0.1607*** [-93.9002]	-0.2215*** [-146.3911]	-0.2040*** [-74.0056]	-0.2246*** [-123.6668]
Beds	-0.2976*** [-106.6509]	-0.0880*** [-19.5744]	-0.3515*** [-104.0812]	-0.2368*** [-86.6191]	-0.0729*** [-17.2903]	-0.2802*** [-82.0371]
FBath	0.1487*** [41.4626]	0.0205*** [3.4249]	0.1894*** [44.2724]	0.1496*** [42.7440]	0.0381*** [6.7829]	0.1823*** [42.4840]
HBath	0.0710*** [22.7996]	-0.0246*** [-5.0779]	0.0860*** [22.4660]	0.0531*** [17.5328]	-0.0366*** [-8.0743]	0.0734*** [19.1554]
Constant	1.5839*** [38.6884]	2.3135*** [34.0848]	1.5903*** [32.5849]	2.7029*** [67.4380]	1.5317*** [24.1205]	2.5811*** [52.0563]
Observations	255,625	128,221	127,404	255,625	128,221	127,404
Adjusted R^2	0.6192	0.6773	0.6093	0.6718	0.7179	0.659

TABLE 4. MARGINAL CHARTER SCHOOL ANALYSIS

Specification	(1)	(2)	(3)	(4)	(5)	(6)
Public School Quality	All Public Schools			Only Public Schools with a Lower than "B" Average Grade		
County	Both	Broward	Miami-Dade	Both	Broward	Miami-Dade
CSPosDiff	0.0284*** [16.4329]	0.0189*** [8.6683]	0.0343*** [11.1952]	0.0484*** [21.0541]	0.0194*** [7.3272]	0.1056*** [17.6072]
PSGrade	0.2783*** [184.1821]	0.2052*** [111.9563]	0.2842*** [115.7485]	0.2745*** [86.3243]	0.2755*** [66.8745]	0.2824*** [46.7964]
LivingArea	1.1830*** [300.9336]	1.2006*** [229.0199]	1.2001*** [228.1096]	1.1866*** [175.0139]	1.2535*** [134.5811]	1.1812*** [136.6921]
Age	-0.1301*** [-119.4150]	-0.1309*** [-71.6527]	-0.1227*** [-89.7655]	-0.1487*** [-81.6251]	-0.1640*** [-46.6194]	-0.1100*** [-52.2516]
Beds	-0.1683*** [-104.0518]	-0.0706*** [-34.1515]	-0.2109*** [-94.9402]	-0.2184*** [-80.7583]	-0.0920*** [-25.0169]	-0.2367*** [-68.2821]
FBath	0.1529*** [80.7896]	0.0768*** [30.3362]	0.1874*** [74.2083]	0.1524*** [43.5071]	0.1067*** [21.4568]	0.1666*** [38.1478]
HBath	0.0881*** [41.2550]	0.0190*** [7.0221]	0.1139*** [38.7714]	0.1162*** [28.4427]	0.0442*** [8.1226]	0.1279*** [24.3057]
Constant	3.5720*** [134.8535]	3.2919*** [93.6744]	2.9511*** [84.6172]	3.8002*** [84.9826]	3.0138*** [45.0841]	3.9712*** [65.8994]
Observations	502,309	251,958	250,351	191,832	96,098	95,683
Adjusted R^2	0.6674	0.7619	0.6479	0.5742	0.6922	0.5818

TABLE 5. MARGINAL CHARTER SCHOOL ANALYSIS - EAST VS. WEST

Specification	(1)	(2)	(3)	(4)
Location	I-95	East of Turnpike	I-95	West of Turnpike
CSPosDiff	0.0072** [2.5681]	0.0205*** [9.2585]	0.0312*** [17.9199]	0.0470*** [23.1641]
PSGrade	0.2774*** [109.7893]	0.2670*** [134.0017]	0.2333*** [155.7314]	0.2239*** [136.9269]
LivingArea	1.3494*** [207.0977]	1.2599*** [252.8458]	0.8259*** [215.6658]	0.7429*** [166.6179]
Age	-0.1320*** [-78.4843]	-0.1262*** [-93.6440]	-0.1293*** [-106.0251]	-0.1205*** [-80.2913]
Beds	-0.2944*** [-102.1466]	-0.2232*** [-104.2973]	-0.0141*** [-9.5553]	0.0389*** [23.3721]
FBath	0.2451*** [75.7942]	0.1979*** [80.9680]	0.0898*** [50.3835]	0.0475*** [23.2207]
HBath	0.1372*** [37.7376]	0.0939*** [33.1609]	0.0208*** [10.4384]	0.0182*** [8.5924]
Constant	2.4344*** [54.8230]	2.8573*** [88.7311]	5.7060*** [227.0364]	6.3823*** [213.6392]
Observations	220,922	351,220	281,386	107,868
Adjusted R <sup>2</sup>	0.6498	0.6534	0.7895	0.8458



TABLE 6. SCHOOL TYPE ANALYSIS

Specification	(1)	(2)	(3)	(4)	(5)	(6)
School Type	Elementary	Middle	High	Elementary	Middle	High
CSGrade	0.0545*** [49.6059]	0.0138*** [14.8339]	0.0648*** [38.9274]	0.0399*** [38.2416]	0.0160*** [18.1336]	0.0684*** [40.9019]
PSGrade				0.1937*** [203.3866]	0.1750*** [215.7986]	0.1344*** [124.9617]
LivingArea	1.3419*** [310.1941]	1.3521*** [353.3817]	1.3771*** [289.7111]	1.1565*** [273.6764]	1.2207*** [329.4821]	1.2870*** [269.1823]
Age	-0.0859*** [-75.3854]	-0.1073*** [-103.3093]	-0.0692*** [-56.7316]	-0.1183*** [-105.2324]	-0.1245*** [-124.8503]	-0.0864*** [-70.3657]
Beds	-0.2108*** [-116.6764]	-0.1788*** [-113.3913]	-0.2248*** [-113.6239]	-0.1677*** [-96.4636]	-0.1578*** [-104.4372]	-0.2114*** [-107.6423]
FBath	0.1839*** [85.8179]	0.1547*** [83.3472]	0.1893*** [82.6214]	0.1669*** [81.3850]	0.1441*** [81.2323]	0.1798*** [79.0552]
HBath	0.1215*** [50.8668]	0.1238*** [60.5796]	0.1294*** [50.1413]	0.1006*** [43.7932]	0.1066*** [54.5610]	0.1189*** [46.2401]
Constant	2.9644*** [102.0302]	2.5206*** [100.3351]	2.1565*** [70.3262]	3.1404*** [115.1194]	2.9448*** [122.2563]	2.5965*** [82.4074]
Observations	502,309	502,309	502,309	502,309	502,309	502,309
Adjusted R^2	0.6047	0.6207	0.5971	0.6534	0.6609	0.6152



## Conclusions

We find evidence that, on average, a small price premium is associated with charter school quality conditioned on the quality of nearby public school options.

The price premium is materially larger when charter quality is greater than the school boundary driven alternatives.

The price premium associated with charter school proximity is more pronounced in areas, and for housing units, that are more likely to accommodate families with school-age children.

The overall premium is driven by family-oriented housing units as other types of housing do not materially benefit in price by proximity to a charter school.

The benefit to proximity to charters schools differs across school type. Charter high schools followed by elementary schools and then middle schools is the ranking.

## More to Come?

This highlights a need in the overall literature on school choice, school quality and residential pricing to segment by school type. Much of the present literature is silent on the type of schools being compared.

An argument could be made that improving a lower performing non-charter public school would have a similar effect. The question then that is not addressed in this study, but is a focal point for choice advocates, is related to the ability of a traditional school to make such an improvement.

The conditioned political debate on school choice including charter schools requires empirical assessment of choice options.

Does choice improve outcomes? Is choice valued or just choice with outcomes?

And how can we look at interaction between elementary, middle and high school?

More work is needed. And the impacts of specific policies need assessment. There has to be a value proposition.