The regulatory tax and house price appreciation in Florida

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1. Introduction

Before the recent downturn in the housing market, much media attention had been paid to the fact that the price of housing soared over the 1990s and the first half of the current decade. According to the repeat sales index published by the Office of Federal Housing Enterprise Oversight (OFHEO), nationally the price of a constant-quality home increased 131% between the first quarter of 1989 and fourth quarter of 2005. Various explanations are offered for this phenomenon: demand-side explanations such as demographic trends, wider financing options, and speculative buying as well as supply-side explanations such as rising costs of construction and increasing land scarcity. Whatever the reasons, rapidly rising house prices have significant welfare costs, particularly among households looking for low or moderately priced homes. Escalating prices represent a significant barrier to first-time homeownership and may lengthen commuting distances between workers and their jobs, as buyers are forced to purchase cheaper homes in distant suburban or exurban communities.

While in some states – particularly those in the Sunbelt – demand and demographic trends undoubtedly encouraged considerable in-migration and subsequent house price increases, the data suggest that fast population growth does not automatically imply rapid price appreciation. Table 1 shows some simple statistics. We calculate appreciation at the metropolitan statistical area (MSA) level between 1989 and 2005 in the OFHEO housing price index and group MSAs from all states into quartiles by price appreciation. We compare four fast-growing states...
– specifically Texas, California, Florida and North Carolina, which place first, second, third and sixth, respectively among the states in absolute population growth as of the 2000 census. We see that while Florida and California have the most MSAs in the top quartile in house price appreciation, Texas and North Carolina have the most MSAs in the bottom quartile. On average across metropolitan areas, prices in Florida and California have appreciated 166% and 188%, respectively, between 1989 and 2005, while those in Texas and North Carolina have grown by only 70% and 87%, respectively. These data suggest that despite rapid growth in demand, house prices in Texas and North Carolina have not risen as quickly as prices in other rapidly growing states. Apparently in Texas and North Carolina with the growth in demand there occurred a commensurate increase in supply. What then happened in Florida and California to maintain such rapid housing price growth?

One possible answer to this question can be found in a strand of recent literature that has looked at the impact of local land use regulations on housing prices. Regulations are often enacted to affect the pattern of land use development, to make communities more attractive and to mitigate negative environmental externalities caused by development. In practice, they encompass a myriad of rules intended to affect the level and the type of development allowed. The most common form of local land use regulation is restrictive zoning, which stipulates different development possibilities for different zones in the jurisdiction. Beyond this, the regulatory arsenals of local governments commonly include impact and permitting fees and environmental impact studies to be undertaken by the developer before permission to build is granted. In Florida, and a growing number of other states, an important subset of regulations are those that implement the comprehensive plans required by state growth management statutes. Finally, some regulations are designed to slow or halt development altogether; examples include annual building permit caps, urban growth boundaries and minimum lot size restrictions.

Notwithstanding the benefits that they may impart on residents, land use regulations impede the supply of housing. The costs of compliance and enforcement hold the supply of new housing back in areas where the demand for housing is expanding; this can result in higher house prices, depending on whether regulatory costs are shifted backward to landowners or forward to housing consumers. Understanding the link between regulations and house prices is crucial to the proper evaluation of regulation policy.

As an example of why land regulation matters to housing policy, consider the fact that rising house prices are closely linked to declines in home affordability. The most widely cited measure of affordability is the Housing Opportunity Index (HOI), published by the National Association of Home Builders, which measures the percentage of homes sold in a given geographic area that are affordable to a household with the median income.

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2 A home is classified as affordable if the median income household facing current interest rates would qualify for the mortgage according to standard underwriting criteria. NAHB assumes that a family can afford to spend 28% of its gross income on housing (http://www.nahb.org).
was in 1995. We argue that part of the variation we observe in affordability comes from the variation in land use regulations, both across metropolitan areas and over time. Indeed, the five metropolitan areas plotted in the figure are chosen to represent different styles of land use regulation, on the basis of a Brookings Institution study by Pendall et al. (2006). Dallas is classified in the group called “Wild Wild Texas”, which is the most growth friendly region in the nation. Chicago is in the “Traditional” category, characterized by voluntary planning and general laxity of land use regulation. Boston belongs to “Exclusion”, and West Palm Beach and San Francisco belong to “Growth Control”; both classes are characterized by more stringent land use regulation and comprehensive plan adoption. The figure shows a clear correlation between the effect of regulatory style and affordability across the metropolitan areas, but also suggests that style is related to the trend in affordability over time. As Pendall et al. point out, in many jurisdictions the local governments have “invented new growth control instruments [and]… modified their use of older standard tools in attempts to influence development outcomes”.

There is a growing economic literature on the effect of regulations on housing values. Quigley and Rosenthal (2005) overview papers on regulations and house prices and find a lack of consensus, which they attribute to methodological and measurement differences across studies. They argue most studies rely on indices of restrictiveness based upon the number and types of regulations in place, which in practice may not reflect the true degree of restrictiveness in a jurisdiction due to differences in enforcement. In recognition of this, more recent work by Glaeser and Gyourko (2003, hereafter GG) and Glaeser et al. (2005a, hereafter GGS) suggest an alternative methodology to measure the effect of regulations on prices. GG and GGS argue that the price of a house, net of its costs of construction, comprises both the value of the lot on which the home is situated and the value of having satisfied all land use regulations. Their studies consist of estimating this last component, which they call the regulatory tax. They argue that their tax is the result of suppressed housing supply and is largely responsible for the high price of housing that can be found within select metropolitan areas throughout the US.

In this paper, we apply and extend the GG methodology to the estimation of the regulatory tax in a set of Florida metropolitan areas, at the same time addressing some of the criticisms that Quigley and Rosenthal have made of previous studies. The contributions of our paper include the use of individual house-level data over a 10-year period, a procedure for determining construction costs of houses of varying quality and a decomposition of the overall house price increase into land, materials and regulatory cost components. In contrast to GG and GGS, who measure the regulatory tax for the average house within a metropolitan area, we, by estimating the tax at the house level and then averaging up, are better able to control for house-specific construction costs and thereby obtain a more reliable estimate of the tax. We find that the tax is a significant component of house price and that increases in this component account for a significant portion of the run-up in Florida house prices between 1995 and 2005, as the regulatory environment within the state over these years became increasingly more stringent. This study also sheds light on the variation of regulatory stringency within a state. We find considerable variation in the scope and scale of regulation used within Florida, leading to different impacts on housing prices.
The paper proceeds as follows. In Section 2, we discuss the theoretical framework underlying the regulatory tax and the measurement of regulatory stringency. In Section 3, we describe the methodology and the data used. In Section 4, we present our results. Section 5 concludes.

2. Background on measuring the land use regulation tax

Stringent regulation may raise prices for new homes because it imposes time and money costs on developers. It also may drive up prices of all homes (both new and existing) by removing land from the possible supply of residential land. The evidence on these possible relationships is highly mixed. Some studies find a strong positive relationship between housing prices and regulation (e.g., Malpezzi, 1996; Glaeser and Gyourko, 2003; Downs, 1991; Glaeser et al., 2005b), while others find little or no relationship (e.g., Phillips and Goodstein, 2000). In general, these studies proceed by finding some measure of regulatory stringency that varies across jurisdictions and then a reduced form model is estimated by regressing housing values or a housing price index on stringency, along with a set of control variables representing other supply and demand shifters.

A fundamental obstacle is how to define regulatory stringency. The standard approach is to use survey data to formulate an index to rate jurisdictions along certain criteria. However, while straightforward, indices may not accurately reflect the burden of stringent regulation. One problem is that the researchers must decide which regulations to include in the index. A related problem is what weight should be given to each regulation. Generally, without justification, each regulation is weighted equally. Finally, arguably the most serious obstacle is that count indices reflect the regulations that are on the books, but the negotiation and compromise that commonly occurs between developers and municipal officials may result in a regulatory environment that bears little relationship to the value of the index. Indeed, Quigley and Rosenthal (2005) argue that the lack of definitive estimates of regulatory stringency in the empirical literature may be due to the fact that “...sometimes, local regulation is symbolic, ineffectual, or only weakly enforced.”

GG and GGS depart from the index approach and instead argue that the price of a house incorporates the costs of having satisfied all local land use regulations. In a competitive housing market devoid of land use regulations, the sales price of a newly constructed house equals the sum of the cost of constructing the house and the value of the lot on which the home is located. The cost of construction includes the cost of labor and materials and also a normal return for the developer. GG’s “regulatory tax” hypothesis holds that regulations, because they add to the costs of construction and restrict lot subdivision, introduce a wedge that drives the selling price of the house higher than the sum of construction and land costs. GG use the American Housing Survey to estimate the regulatory tax faced by the average house in various MSAs, and they find that the tax is negligible in some areas (mostly in the Midwest), but substantial in others, including markets in California, Florida and New York. Thus they claim that in some selected markets prices are high because of myriad land use regulations.

In this paper, we apply the GG regulatory tax concept to house-level data from Florida. Our methodology has certain advantages over GG and allows us to address some of the concerns about GG’s measurement of construction cost and housing quality, raised by such authors as Somerville (2004). We use individual house level data from the Florida property tax rolls and estimate the regulatory tax borne by the purchasers of individual homes. We use actual sales price instead of an owner-estimated value, which addresses one of the limitations of prior studies raised by Quigley and Rosenthal (2005). Our estimations allow us to move from speculation regarding the regulatory environment and its role in explaining rising house prices to a solid estimate of its impact. Finally, the panel aspect of our data allows us to calculate the regulatory tax for parcels for each year between 1995 and 2005, which enables us to decompose the total change in the price of housing into the portions attributable to construction costs, land value and the regulatory tax. This represents an improvement over previous papers, which for the most part are static in nature.

Because our data allow us to estimate the regulatory tax on an individual house level, we can compute the mean value of the tax for any level of aggregation in order to summarize our results. We argue that the correct level of aggregation is the metropolitan area. While cities within the same metropolitan area have different land use regulations, inter-jurisdictional differences in regulatory restrictiveness cannot cause differences in the regulatory tax across cities if, as is commonly assumed, consumers are mobile within the metropolitan area. However, the average level of restrictiveness within the metropolitan area may affect the metropolitan-wide housing price, since it is reasonable to assume that the demand for housing at the metropolitan level is less than perfectly elastic.

3. Methodology and data

Our general methodology for estimating the regulatory tax follows that of GG and GGS. In equilibrium, the cost of a home in an unregulated market comprises two distinct components: the value of land and the value of the improvement on the land. If we denote the price of a home

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3 Restricting the supply of new housing can also reduce the rate at which higher quality homes filter down to lower income households. For empirical evidence of this effect, see Mayer and Somerville (2000).

4 For instance, Brueckner (1998) counts the number of growth controls.

5 See Somerville (2004) for a more thorough review of these issues.

6 In addition, Quigley and Rosenthal cite four areas that the traditional literature has failed to address. They are (i) ignoring the endogeneity between housing prices and regulations; (ii) not recognizing the interaction between policymaking and regulatory behavior; (iii) infrequent administering of regulatory surveys; and (iv) failing to use sophisticated price indices that correct for biases in price reporting.

7 It is important to keep in mind that the regulatory tax is not a tax per se, but rather a measure of the additional costs incurred as part of complying with the land use regulations and regulation-driven supply restrictions. We use the term tax in order to be consistent with GG and GGS.
on a lot of size \( L \) as \( P(L) \), this equilibrium condition can be written as
\[
P(L) = rL + K,
\] (1)
where \( r \) denotes the per unit price of land and \( K \) denotes the cost of constructing the home.

In the presence of land use regulations, however, regulatory compliance costs for developers and restrictions on the subdivision of lots drive a wedge between the value of a lot of size \( L \) in a competitive market \( (rL) \) and the residual value of land obtained by netting out the cost of construction from the price of housing \( (P(L) - K) \). GG and GGS call this difference between the two implicit land values the regulatory tax, denoted \( T \) below.\(^9\) The equilibrium condition in the regulated model is now
\[
P(L) = rL + K + T,
\] (2)
and the price appreciation of a property can be decomposed into three distinct parts: the change in the value of land, \( \Delta r \); the change in the costs of construction, \( \Delta K \); and the change in the regulatory costs, \( \Delta T \). In unregulated markets in which the market value of land is not increasing over time, this condition suggests that the increase in the value of a home should be roughly equal to the increase in the cost of home construction. To get a sense of whether this is reasonable, we plot in Fig. 2 the evolution of the OF-HEO price index along with the RS Means Company MSA-level construction cost index for the five MSAs mentioned in the previous section. The home price trends for Dallas and Chicago (the least regulated according to the Brookings study) follow the cost of construction trends closely over the ten-year period.

The remaining three MSAs tell a different story. The price trends for West Palm Beach, Boston and San Francisco follow the construction cost trend at the beginning of the sample period, after which the two trends diverge dramatically. Appealing to Eq. (2), this divergence between home values and construction costs may be attributable to either increasing land value or costs of housing regulations.\(^{10}\)

Determining the relative importance of the land and regulation components necessitates estimating the value of land in various locales. As GG suggest, the value of an additional unit of land can be estimated using standard hedonic regressions. Once this land value is estimated, the proportion of the home’s value attributable to regulatory costs can be backed out using the equilibrium condition. By repeating this estimation over time, we can decompose the change in housing value into the portions attributable to changes in construction, land and regulatory costs.

3.1. Data and the Florida regulatory environment

We utilize a rich set of data containing geographic and sales information for single-family residences in the 20 MSAs in Florida.\(^{10}\) The MSAs, each of which is composed of one or more counties, range widely in size as shown in the summary statistics of Table 2. All parts of the state – Panhandle, inland and coastal – are represented in our analysis. One MSA (Tallahassee) has only one incorporated city, while another (Miami-Hialeah) has 35. There is also variation in housing price appreciation, as measured by changes in the median sales price between 1995 and 2005. Finally, there is evidence that suggests that there is variation in regulatory stringency across MSAs. Developers and planners tend to agree on which counties are stricter and which are laxer. For instance, Leon County (Tallahassee MSA) has a reputation for being stringent and anti-growth, while Polk County (Lakeland MSA) has a reputation for no-holds-barred, laissez-faire growth. While these perceptions are anecdotal, it is worthwhile to note that they are taken seriously by land developers, who have a clear interest in knowing how much complying with regulations will add to their costs. As additional evidence, Ihlanfeldt (2007) calculates regulatory indices for Florida cities using the results from a 2002 survey of the chief planner of each city. The indices range from 1 (least stringent) to 7 (most stringent). We report the index for the largest city in each MSA in the last column of Table 2. They provide additional evidence that there is a range of regulatory stringency among the metropolitan areas that we examine.

In addition to cross-sectional variation in regulatory stringency, there are two reasons to believe that statewide regulation has over time become more stringent. Florida passed its Growth Management Act in 1985, which mandates comprehensive planning at the local level. Chapin et al. (2007) note that the land development regulations required to implement the plans began to be adopted by local governments in the early 1990s and these regulations have grown in number and complexity since then. Moreover, regulations adopted at one point in time may not impede supply until later, when continuing population growth causes the constraint imposed by the regulation to become binding. There are many examples of such regulations in Florida, with the two most recognizable being urban growth boundaries and transportation concurrency. As long as the boundary is beyond the urban fringe, it has little effect on the pace of development. Similarly, as long as traffic is low enough such that the required level of service is satisfied on a particular roadway, development continues to occur.

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\(^8\) A concern Somerville (2004) raises with GG is that they assume that \( T \) is constant. In reality the regulatory taxes may vary with the size of the house. We discuss this issue further on in the paper.

\(^9\) Previous literature on house price appreciation hints at the role that regulations play. Jud and Winkler (2002) look at house price appreciation across 130 metropolitan areas and explain the yearly price appreciation by the growth in variables such as population, income, wealth, interest rates and construction costs. They take a fixed effects framework to control for MSA-specific cost factors. Their explanatory variables are all positive and significant (with the largest coefficient appearing on population growth), but notably, they find that the estimated MSA fixed effects are correlated with growth restriction indexes developed in Malpezzi (1996), Segal and Sirmans (1985) and others. Malpezzi et al. (1999) also use cross-MSA data and include a regulatory index as a determinant of house price appreciation. A city that moves from the first to the third quartile of regulatory stringency experiences a house price increase of between 32% and 46%.

\(^{10}\) In our analysis, MSAs are constructed using the 1990 definitions from the U.S. Census Bureau.
House price information is obtained from the Florida Department of Revenue’s (DOR) abbreviated county tax rolls from 1995 to 2005. For each parcel’s two most recent sales, these rolls contain information on the price of the home, whether the transaction was arm’s-length, and the year and month of sale. In addition to the sales information, the rolls also contain typical structural characteristics such as the year the improvement was built, whether or not the parcel was improved at the time of sale, and interior living space. Finally, the greatest strength of the DOR data is that for each parcel we have information on the replacement cost of all of the improvements on the site. This aspect of the data is discussed more thoroughly below.

We first select the arm’s-length transactions of improved single-family properties for each year between 1995 and 2005. Using GIS techniques, the square footage of each parcel is calculated, and the record for each parcel
is assigned to a jurisdiction, census tract, and census block group. We also calculate the distance from each parcel to the center of the appropriate central business district and the distance from the parcel to the coast for coastal MSAs. A final series of sample cuts are made to minimize the influence of outliers. The last column of Table 2 reports the number of parcels in the sample of each MSA over the 10-year period.

### 3.2. Empirical methodology for estimating the regulatory tax

The first step in calculating the regulatory tax is to estimate the intensive value of land \( r \). It is important to note that in this context, the intensive value of land, measured per square foot, is simply the consumption value of an extra square foot of lot. Reiterating GG’s argument, in a world lacking regulatory constraints, the intensive value of a unit of land would be the price at which the homeowner would be indifferent between (1) consuming the land and (2) subdividing and selling it. The fact that there are regulatory barriers to subdividing, permitting and building on land is precisely why a wedge is formed between the intensive and extensive values of land.

Although the theoretical foundations of the implicit market valuation approach are well-established (Rosen, 1974), theory provides little help in specifying the functional form of the hedonic function. As our interest is not in the values of each of the hedonic coefficients per se, but rather using these estimates to estimate the value consumers place on additional yard space, special attention was paid to how estimates of the regulatory tax varied across empirical specifications. The summary measures of the regulatory tax and the results from the decomposition (reported below) were remarkably stable across a number of specifications including log-linear models, models in which the size of the lot is interacted with block group descriptors, and linear models that include a quadratic lot size term. Given the invariance of the regulatory cost estimates across the models, for the sake of parsimony, we focus on the most easily interpretable model: a linear specification augmented with a quadratic lot size term.

The unit of analysis is a single-family house that sold between 1995 and 2005, and the dependent variable is the sales price. The key explanatory variable is \( lotsize \), the size of the lot on which the house is situated. Other control variables include (1) distance measures to the central business district and to the coast; (2) two house characteristics, living space and age; (3) dummy variables for quarter of sale to capture seasonal effects; and (4) dummy variables for the local jurisdiction. Table 3 summarizes the variables used in the hedonic.

---

11 When assigning parcels to census tracts and block groups, we utilize the tract and block group definitions from the 2000 Census.

12 Only homes on lots less than one acre in size are included in the sample. In general, including larger homes tended to depress the implicit price of land, increasing the regulatory tax. This could possibly reflect a bias in that homes situated on very large lots are located in areas where land is inexpensive for some unobservable reason. We also filtered out sales for which the total living space or sales price per square foot appeared to be extreme. The final sample includes only homes with total living space between 600 and 6000 square feet and with price per square foot values between $20 and $250.

---

**Table 2**

Population, home values, regulatory environment and sample size for Florida MSAs.

<table>
<thead>
<tr>
<th>MSA name</th>
<th>No. of counties in MSA</th>
<th>Population 1995</th>
<th>Median home sales price 1995</th>
<th>Regulatory index* for largest city</th>
<th>Sample size of properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bradenton</td>
<td>1</td>
<td>237,593</td>
<td>96,000</td>
<td>3</td>
<td>50,881</td>
</tr>
<tr>
<td>Daytona Beach</td>
<td>1</td>
<td>413,419</td>
<td>72,900</td>
<td>3</td>
<td>67,790</td>
</tr>
<tr>
<td>Fort Myers-Cape Coral</td>
<td>2</td>
<td>391,823</td>
<td>89,900</td>
<td>5</td>
<td>100,778</td>
</tr>
<tr>
<td>Fort Pierce</td>
<td>2</td>
<td>290,527</td>
<td>67,000</td>
<td>1</td>
<td>59,712</td>
</tr>
<tr>
<td>Fort Lauderdale- Hollywood-Pompano Beach</td>
<td>1</td>
<td>1,447,124</td>
<td>117,900</td>
<td>2</td>
<td>304,331</td>
</tr>
<tr>
<td>Fort Walton Beach</td>
<td>1</td>
<td>162,900</td>
<td>84,900</td>
<td>3</td>
<td>31,065</td>
</tr>
<tr>
<td>Gainesville</td>
<td>2</td>
<td>228,234</td>
<td>71,500</td>
<td>5</td>
<td>30,197</td>
</tr>
<tr>
<td>Jacksonville</td>
<td>4</td>
<td>1,000,149</td>
<td>85,900</td>
<td>6</td>
<td>49,213</td>
</tr>
<tr>
<td>Lakeland-Winter Haven</td>
<td>1</td>
<td>447,182</td>
<td>69,000</td>
<td>3</td>
<td>55,198</td>
</tr>
<tr>
<td>Melbourne-Sarasota-Palm Bay</td>
<td>1</td>
<td>451,310</td>
<td>80,400</td>
<td>5</td>
<td>90,241</td>
</tr>
<tr>
<td>Miami-Hialeah</td>
<td>1</td>
<td>2,086,286</td>
<td>114,500</td>
<td>5</td>
<td>169,032</td>
</tr>
<tr>
<td>Naples</td>
<td>1</td>
<td>199,639</td>
<td>139,800</td>
<td>4</td>
<td>28,333</td>
</tr>
<tr>
<td>Ocala</td>
<td>1</td>
<td>230,611</td>
<td>69,000</td>
<td>3</td>
<td>26,597</td>
</tr>
<tr>
<td>Orlando</td>
<td>3</td>
<td>1,250,442</td>
<td>93,900</td>
<td>6</td>
<td>324,492</td>
</tr>
<tr>
<td>Panama City</td>
<td>1</td>
<td>142,101</td>
<td>75,000</td>
<td>3</td>
<td>15,593</td>
</tr>
<tr>
<td>Pensacola</td>
<td>2</td>
<td>380,205</td>
<td>71,900</td>
<td>2</td>
<td>67,594</td>
</tr>
<tr>
<td>Sarasota</td>
<td>1</td>
<td>304,165</td>
<td>85,000</td>
<td>3</td>
<td>15,593</td>
</tr>
<tr>
<td>Tallahassee</td>
<td>2</td>
<td>266,586</td>
<td>172,550</td>
<td>7</td>
<td>40,668</td>
</tr>
<tr>
<td>Tampa-St Petersburg-Clearwater</td>
<td>4</td>
<td>2,226,036</td>
<td>81,000</td>
<td>4</td>
<td>348,125</td>
</tr>
<tr>
<td>West Palm Beach- Boca Raton- Delray Beach</td>
<td>1</td>
<td>1,013,781</td>
<td>1,08,300</td>
<td>7</td>
<td>105,903</td>
</tr>
</tbody>
</table>

**Florida** | 14,537,875 | 17,736,027 | 105,500 | 3.6**

---

**Notes:**

- Index as in Ihlanfeldt (2007). The higher the index, the more stringent is the regulation.
- State mean.

---

13 The unincorporated portion of a county is counted as a local jurisdiction and assigned a dummy variable accordingly.
To allow for the intensive margin to vary across both MSAs and over time, the following model is separately estimated for each MSA-year combination:

\[
sale = \alpha + \beta_1 \left( \frac{1}{DistCBD} \right) + \beta_2 \left( \frac{1}{DistCoast} \right) + \gamma_1 \text{ lotsize} \\
+ \gamma_2 (\text{lotsize})^2 + \delta_1 \text{ age} + \delta_2 \text{ age}^2 + \zeta_1 \text{ totaliv} \\
+ \zeta_2 \text{ totaliv}^2 + 1 + Q + \varepsilon
\]  

(3)

Based on standard errors that are robust to heteroskedasticity and clustering at the block group level, the estimates of the coefficient on lot size turn out to be precisely measured. For each parcel in the sample, we use the estimate of the intensive margin \(\frac{\partial(\hat{r})}{\partial L}\), and the size of the lot, \(L\), to estimate the implicit value of the land on which the home is sitting. This serves as an estimate of \(\hat{r}\) in the equilibrium condition (Eq. (2)).

The next step is to estimate the cost of construction of each home, \(\hat{K}\). GG and GGS used indirect methods to estimate \(\hat{K}\); specifically, they used data from the companies RS Means and Marshall and Swift to estimate the cost per square foot of living space for homes of various qualities. Somerville (2004) notes that the major drawback of this approach is that it requires ad hoc assumptions regarding the quality of construction. Furthermore, even if the quality of construction is correctly assumed, simply using data on the cost of constructing the primary structure of the house is likely to underestimate the true construction cost of all the improvements on the property. Even homes of low quality construction may have special features such as pools, decks and sheds. Failing to account for the value of these improvements will bias the tax upwards across all home qualities.

One of the primary strengths of our data is that for each parcel, the county appraiser’s office reports the replacement costs, accounting for depreciation, of all of the improvements on a given parcel; we use this as our measure of \(\hat{K}\). These improvements include the main structure as well as any special features, such as a pool, garage or deck. The detail involved in generating these replacement values is substantial. After an improvement that requires a permit is recorded on a parcel, the county appraiser must physically inspect the property. The appraiser then uses a combination of information on national and local construction costs in order to estimate the cost of replacing all of the improvements on the property under current factor input cost conditions. For the main structure, these cost estimates reflect the quality and size of construction and the type of exterior materials used. Quality is usually graded on a scale from 1 (well below average) to 6 (well above average). For special features such as pools and decks, the quality of construction is also taken into account. The total improvement value for the property is then adjusted to reflect structural depreciation. There is also a legal requirement for appraisers to physically inspect the property at least once every five years, regardless of whether a permitted improvement has been recorded.

Of course, the reliability of \(\hat{K}\) is only as good as the appraiser’s accuracy in determining the quality of the improvements. Unobservable features may bias our estimates of the construction cost, and hence our estimates of the regulatory tax, on two dimensions. The first dimension is that they may affect our estimates at a given point in time. For instance, some improvements are only observed after the appraiser’s periodic on-site inspection has occurred. Hence, appraised values lag improvements because there are delays in updating the record of improvements. Another potential source of unobservables comes from interior improvements that do not require a building permit, such as new floors or new appliances. Because the appraiser cannot account for these interior upgrades, the construction cost estimate will be underestimated. This error may be magnified in high-end houses because as homes become more valuable, the more valuable the unobservable improvements are likely to be.

The second dimension is that the bias caused by unobservable improvements may be exacerbated over time. In periods of rapid price appreciation, home improvements, both observed and unobserved by the appraiser, may become more popular if homeowners take advantage of equity loans to finance improvements. In addition, households may substitute towards those upgrades and remodeling projects that do not require permits if regulations become more onerous.

While acknowledging the potential biases associated with the inability of the appraiser to observe all home improvements, we argue that to the extent that interior improvements usually cost much less than observed improvements (for example, a room addition), our replacement cost values should not be subject to serious measurement error. We also note that our estimated replacement costs still represent a substantial improvement over previous work, which generally has relied on metropolitan-level construction cost tables.

14 Note that we use a reciprocal transformation to capture the relationship between price and distance to the CBD (coast). This transformation assumes that price decreases at a decreasing rate as distance increases between the property and the CBD (coast). As such, it has intuitive appeal and is consistent with the standard urban model.

15 The hedonic regression results are available upon request.

16 More information on the data can be found at http://dor.myflorida.com/dor/property/appraisers.html.

17 Depreciation rates are based on the actual age of construction for each individual improvement. For instance, suppose there are two improvements on a parcel: a house that is ten years old and a swimming pool that is two years old. The depreciated value of the total improvement value of the property reflects the fact that the improvements are of different ages.
Given our estimate of the consumption value of the lot and the value of all improvements, the regulatory tax is calculated as follows:

$$
\tilde{T} = \text{Sale Price} - \tilde{K} - \frac{dP(L)}{dL}L.
$$

We call this $\tilde{T}$ the “uncorrected regulatory tax” on a parcel.

4. Correcting for amenity effects

An important issue that arises with our methodology is whether $\tilde{T}$ from Eq. (4) is entirely attributable to land-use regulation. The model above assumes that all land is homogeneous, and there is no price differential in the cost and consumption value of a square foot of lot. If some parcels in the sample are located in areas that command a locational premium, however, these assumptions are violated. As a result, the uncorrected regulatory tax will overstate the effect of regulatory stringency on parcels that command locational premia. We now present an alternative approach to estimating the regulatory tax that corrects for such amenity differentials.

If parcels of land differ in an amenity value $A$ that is unmeasured and orthogonal to the land consumption value, the price of the house, net of implicit land value ($rL$) and construction costs ($K$), will comprise the amenity value ($A$) as well as the regulatory tax. To accurately estimate the regulatory tax, an estimate of $A$ ($\hat{A}$) must be included in the right hand side of Eq. 4, which implies

$$
\hat{T}_A = \text{Sale Price} - \hat{K} - \frac{dP(L)}{dL}L - \hat{A}.
$$

If we do not net out the amenity component, we will tend to overestimate the regulatory tax.\(^{18}\) Looking at price appreciation over time, we may attribute too much of the appreciation to regulatory tax increases, when in fact it may be the amenity value that is appreciating. There are many sources of locational premia within metropolitan areas, but arguably the most important are CBD and coastal access. We therefore treat the amenity value of a parcel as a function of its proximity to the central business district (CBD) and, for a parcel in a coastal county, its proximity to the coast. Parcels located farther away from the CBD (or the coast) will command lower prices, as consumers require a compensating price differential for costly commutes. By comparing two otherwise identical homes, one located at the urban fringe ($f$) and another located $d$ miles from the CBD, with $d < f$, we can estimate the amenity value associated with access to the business district at distance $d$ as the difference in the estimated value of the two homes. An analogous procedure can be used to estimate the amenity value associated with beach access. We can then estimate $A$ as the sum of the beach and CBD access premia. With $A$ in hand, we estimate the implicit value of the lot as the sum of this amenity value and the pure consumption value of land ($\hat{A} + \frac{dr(L)}{dL}L$).

We utilize the estimated coefficients from the hedonic price (Eq. (3)) to operationalize this amenity correction.\(^{19}\) The first step in the process is to estimate the location of the urban and coastal fringes. To locate the urban fringe, we predict the value of an otherwise_similar home located progressively farther from the CBD using the coefficient on the inverse distance term ($\hat{\beta}$) from the hedonic.\(^{20}\) We then compare the difference in the estimated value of this home at consecutive distances (e.g., the value of the home at $d = 1$ and $d = 1.1$). We define the urban fringe (denoted $f$) as that point at which this value difference is $100 or less. For each parcel in the sample, we then estimate the price of the parcel at the urban fringe and the price of the parcel at its actual location. The difference in these predicted values then serves as our estimate of the parcel’s urban access amenity.\(^{21}\) For coastal MSAs, we repeat this procedure using the coefficient on the inverse coastal distance term ($\hat{\beta}$) from the hedonic. As in the case of CBD access, a parcel’s coastal access value is estimated as the difference between the estimated value of the parcel at the “coastal fringe” and the estimated value of the parcel at its actual location. The total amenity effect ($\hat{A}$) is the sum of the CBD and coastal effects.\(^{22}\)

As we repeat this amenity correction procedure for each MSA-year combination, we allow $A$ to vary across space and time. Additionally, our procedure allows for the urban and coastal fringes to change over time in response to changes in macroeconomic conditions such as population or income growth.\(^{23}\) After estimating $A$, we calculate $\hat{T}_A$ using Eq. (5). In what follows, we refer to $\hat{T}_A$ as the “amenity-corrected regulatory tax.”\(^{24}\)

\(^{18}\) We also estimated our hedonic model with census tract fixed effects in lieu of jurisdiction fixed effects; results are not qualitatively very different.

\(^{19}\) More specifically, we estimate the value of this home in one-tenth of a mile increments, moving progressively farther away from the CBD. We did experiment using finer step size increments for a number of MSAs. The results from these experiments were virtually identical to the estimates under the one-tenth of a mile step size.

\(^{20}\) For parcels beyond the urban fringe, the urban access amenity value is set to zero.

\(^{21}\) As the fringe moves outward, the amenity value of a parcel at a given distance from the CBD (coast) increases in value, as predicted by the standard urban model.

\(^{22}\) We also used an alternative method to account for amenity values by using the census tract fixed effects in our hedonic to stand for $A$. This assumes that the amenity component is identical throughout the tract and invariant to lot size. When we net this tract fixed effect out, the regulatory tax we derive captures that portion of the regulatory tax that is orthogonal to the amenity value. We interpret $\hat{T}_A$ estimated using these tract fixed effects as a lower bound estimate of the regulatory tax because $A$ will sweep out whatever is common across homes within the census tract. In this case, $A$ not only represents amenity values but also incorporates a common regulatory component. That said, it is possible that regulatory taxes may still differ even within an area as small as the census tract, as in practice there is often a great deal of idiosyncratic negotiation between developers and municipal officials. As expected, the results from this alternative correction generally give much smaller estimates of the regulatory tax, but nonetheless still suggest that the tax exists and is increasing overtime for most of the MSAs. We do not report results from this correction, but they are available upon request.
5. Estimation results

5.1. Estimates by MSA and by year

Because of space constraints we do not present numerical results for each MSA and for each year in our sample.\footnote{Although they are available upon request.} Rather, to motivate the discussion, we report summary means for three MSAs – one large (West Palm Beach), one medium (Lakeland), and one small (Tallahassee) – and only for 1995 and 2005. Later, however, results are presented and discussed graphically for all MSAs and years.

Tables 4–6 present, for each of the three MSAs, summary means of the regulatory tax calculations without and with the corrections for amenity effects.\footnote{The results reported are based on estimates from Eq. (3). Alternative specifications, including models that allow for census tract fixed effects, produced very similar results.} The “extensive margin” measures the per square foot price of the house exclusive of construction costs, while the intensive margin measures the per square foot consumption value of the land. The intensive margin is quite small, both in absolute value and relative to the extensive margin; as such, the magnitudes are consistent with GG’s findings for Florida MSAs. This large difference between the prices on the two margins reflects a wedge that could be attributable to the costs of regulation.

While remaining relatively small, the intensive margin did rise substantially in a number of MSAs over the decade, indicating that in some areas the value attached to a larger lot is rising. Of our three representative MSAs, the percentage change in the intensive margin has been most substantial in Lakeland. This increase may be attributable to a transition from an area highly dependent on phosphate mining and citrus farming to a bedroom community for commuters to Tampa and Orlando. The change in the intensive margin was much smaller in Tallahassee and West Palm Beach. Relative to the intensive margin, the estimated extensive margins are quite large and have grown much more rapidly over time. This is true for our three representative MSAs, as well as the full sample of MSAs.

Focusing now on the taxes themselves, we see that for all three metropolitan areas, the mean regulatory tax is substantial in absolute dollars, ranging from $19,306 in Tallahassee in 1995 to $132,860 in West Palm Beach in 2005. As a percentage of sales price the tax is also large, ranging from 9% in West Palm Beach in 1995 to 40% in Lakeland in 1995. Looking at the change in the tax over time shows a substantial increase in all MSAs. In West Palm Beach and Tallahassee, the growth of the regulatory tax without the amenity correction has substantially outpaced housing price growth. This is reflected in the fact that the mean ratio of tax-to-sale price has increased between 1995 and 2005. In these two MSAs, it appears that the costs of complying with regulation now represent a higher percentage of the home value than they did ten years ago. In Lakeland, though the mean regulatory tax has grown over the period, the average tax-to-value ratio in 2005 was less than half the size of the 1995 tax-to-value ratio.

Switching to the amenity-corrected regulatory taxes, there is little change in the above conclusions. The tax remains large in magnitude and has grown substantially over time. However, the effect of the amenity correction on the estimated regulatory tax varies by MSA. In West Palm Beach, the effect of regulation in 1995 is substantially attenuated when we correct for parcel-level access amenities, with the average tax falling by approximately 18% after the amenity correction. Parcel-level access premia appear to be much less important in Lakeland and Tallahassee, however, as the amenity-corrected and uncorrected estimates of the average regulatory tax are virtually identical. The difference between the corrected and uncorrected models appears to be even less important in 2005, with little difference between the two estimates of regulatory costs in each of the three MSAs. These results suggest that although there is generally a large locational premium for individual parcels located close to the CBD and the coast, when averaging across all parcels at the metropolitan level, CBD and beach access have little effect on the average price.

The close relationship between the uncorrected and the corrected estimated regulatory taxes is borne out by examining the 20 MSAs together. The mean regulatory tax-to-

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|}
\hline
& Tallahassee & & \\
& 1995 & 2005 & \\
\hline
\text{Extensive margin} & Uncorrected & 3.70 & 8.05 \\
\text{Intensive margin} & Uncorrected & 1.32 & 1.47 \\
\text{Implicit land value} & Uncorrected & 11,961 & 12,464 \\
\text{Regulatory tax} & Uncorrected & 19,306 & 18,803 \\
\text{Tax/sale price} & Uncorrected & 0.17 & 0.16 \\
\text{Observations} & Uncorrected & 3460 & 5632 \\
\hline
\end{tabular}
\caption{Tallahassee MSA: mean values for regulatory tax calculations. Extensive and intensive margins are expressed in square foot terms. Implicit land value and regulatory taxes are expressed in dollars.}
\end{table}

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|}
\hline
& Lakeland & & \\
& 1995 & 2005 & \\
\hline
\text{Extensive margin} & Uncorrected & 3.45 & 6.33 \\
\text{Intensive margin} & Uncorrected & –0.01 & 1.27 \\
\text{Implicit land value} & Uncorrected & 32,601 & 32,677 \\
\text{Regulatory tax} & Uncorrected & 32,677 & 43,269 \\
\text{Tax/sale price} & Uncorrected & 0.40 & 0.40 \\
\text{Observations} & Uncorrected & 4898 & 14,242 \\
\hline
\end{tabular}
\caption{Lakeland MSA: mean values for regulatory tax calculations. Extensive and intensive margins are expressed in square foot terms. Implicit land value and regulatory taxes are expressed in dollars.}
\end{table}

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|}
\hline
& West Palm Beach & & \\
& 1995 & 2005 & \\
\hline
\text{Extensive margin} & Uncorrected & 7.58 & 19.83 \\
\text{Intensive margin} & Uncorrected & 4.39 & 4.56 \\
\text{Implicit land value} & Uncorrected & 37,668 & 44,684 \\
\text{Regulatory tax} & Uncorrected & 37,677 & 43,269 \\
\text{Tax/sale price} & Uncorrected & 0.09 & 0.09 \\
\text{Observations} & Uncorrected & 8577 & 14,547 \\
\hline
\end{tabular}
\caption{West Palm Beach MSA: mean values for regulatory tax calculations. Extensive and intensive margins are expressed in square foot terms. Implicit land value and regulatory taxes are expressed in dollars.}
\end{table}
value ratio for each MSA between 1995 and 2005 is plotted in Figs. 3 and 4. The dashed line represents $T_A$ as the measure of regulatory cost, while the solid line is the uncorrected ratio using $T$ as the measure of regulatory cost. In the majority of metropolitan areas, these two trend lines track each other very closely, though, as expected, the amenity-corrected ratio is generally lower than its uncorrected counterpart. The only instances of relatively large divergences between the corrected and uncorrected ratio estimates are MSAs located in southern, coastal Florida (e.g., Fort Lauderdale, West Palm Beach, and Miami-Hialeah).

As the figures show, in 12 of the 20 MSAs, the average tax to sales price ratio increased between 1995 and 2005. The increases are particularly large in Ocala, West Palm Beach, Orlando, and Panama City. A common feature of these metropolitan areas is that, except for Panama City, they are among the five fastest growing metropolitan areas in the state (as measured from 1990 to 2000 with Census data). This is not surprising, because, as noted earlier, restrictive supply-side regulations have their greatest effect on housing prices where demand is strongest.

5.2. Appreciation decomposition

The results above suggest that the driving force of price appreciation over time may differ substantially across different Florida housing markets. In metropolitan areas with increasing regulatory tax-to-value ratios (such as West Palm Beach), it appears that appreciating property values may be due to increasingly stringent regulatory environments. On the other hand, appreciation in areas for which this ratio is changing little over time (such as Miami) appears to be driven by increasing land values, construction costs, or amenity values.

The multi-year nature of our dataset allows us to disentangle the relative importance of the regulatory cost, land cost and construction cost components of price appreciation over the sample decade. Without accounting for amenities, the change in home value can be decomposed as $\Delta P = \Delta r + \Delta K + \Delta T$. The share of a home’s appreciation that can be attributed to increasing regulatory, land and construction costs can thus be estimated as $\frac{\Delta r}{\Delta P}$, $\frac{\Delta K}{\Delta P}$, and $\frac{\Delta T}{\Delta P}$, respectively. To do our decomposition, we first estimate the regulatory tax and intensive margin for each parcel in each year as described above. We then select those parcels that have sales occurring in both 1995 and 2005 and calculate the various components of the total price increase separately for each MSA.27

---

27 Although selecting homes that sold both in 1995 and 2005 may seem too limiting, this was not the case. In the Tallahassee MSA, 8% of the homes that sold in 1995 were also sold in 2005. In the Lakeland and West Palm Beach MSAs, this figure is 5.5% and 6.3%, respectively.
Columns (1) to (3) of Table 7 report summary results for our three representative MSAs: Tallahassee, Lakeland and West Palm Beach. The key finding is that regulatory cost appreciation accounts for a significant share of the overall price increases, ranging from around 13% in Lakeland to over 50% in West Palm Beach. In Tallahassee and Lakeland, construction cost increases account for about 70% of the total house price appreciation, probably reflecting the similarity of construction costs across markets throughout the state. The share of appreciation attributable to construction was somewhat lower in West Palm Beach, with physical costs explaining approximately half of the price increase. Finally, it is interesting to note that the regulatory share is larger than the land share in two of the three MSAs. The value of land in the Tallahassee MSA accounts for only about 2% of the total price appreciation, presumably due to the availability of developable land in the Florida Panhandle region. The implicit land value appears to have risen even more slowly in West Palm Beach as the estimated land share is less than 1%. In Lakeland, however, it appears that the intensive margin rose much more quickly, accounting for almost 15% of appreciation.

The percentages in the first three columns of Table 7 all tell a similar story: namely, that the increases in the value of being able to build on the land (i.e., the value of having satisfied the land use regulations) make an important contribution to house price appreciation within our three MSA sample. However, there remains the possibility that the land value component of appreciation has been underestimated (and thereby the regulatory component overesti-

---

Table 7

<table>
<thead>
<tr>
<th>MSA</th>
<th>Obs.</th>
<th>Uncorrected Share of appreciation</th>
<th>Amenity correction Share of appreciation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(1) Land (%) (2) Const. (%) (3) Regul. (%)</td>
<td>(4) Land (%) (5) Const. (%) (6) Regul. (%)</td>
</tr>
<tr>
<td>Tallahassee</td>
<td>290</td>
<td>1.8 71.0 27.2</td>
<td>3.4 71.0 25.6</td>
</tr>
<tr>
<td>Lakeland</td>
<td>269</td>
<td>14.9 72.5 12.6</td>
<td>15.2 72.5 12.3</td>
</tr>
<tr>
<td>West Palm Beach</td>
<td>541</td>
<td>0.1 45.3 54.6</td>
<td>-2.6 45.3 57.3</td>
</tr>
</tbody>
</table>

---

The appreciation decomposition figures reported are the average appreciation shares, with the mean taken over all sales occurring in both 1995 and 2005.
mated) by not correcting for possible increases in the amenity value of land. We examine this issue in the next three columns of the table.

In a manner parallel to the previous section, if we account for the fact that the price of a home reflects the amenity value of the land (as distinct from the pure consumption value of the land), then our decomposition identity is $\Delta P = \Delta r + \Delta \bar{A} + \Delta T_r$. Should the amenity value be appreciating over time, we would expect the land share of appreciation to be larger using this specification. Columns (4) to (6) of Table 7 show the results. The amenity-corrected land share almost doubles in Tallahassee, though the corrected land share still explains less than 4% of the appreciation over the period. The regulatory component falls slightly from 27.2% to 25.6%. In West Palm Beach, the amenity (or disamenity) correction reduces the land share from 0.1% to 2.6%, resulting in an even larger appreciation share attributable to regulation. Finally, the amenity correction appears to make little difference in Lakeland as the uncorrected and amenity-corrected estimates are virtually identical. In all three MSAs then, the amenity correction does not substantively change the regulatory component. The fact that large estimated regulatory components remain suggests that regulatory factors have contributed substantially to home price appreciation.

To expand the analysis to all twenty Florida MSAs, we present graphics of the decomposition in Fig. 5. For each MSA, we present the decomposition for the uncorrected model in the left bar graph (labeled S for the standard model) and for the amenity-corrected model in the right bar graph (labeled A). The dark bars represent the proportion of the price appreciation that we attribute to the local regulatory environment. Comparing the size of the bars, we see that regulation has contributed to increasing prices in MSAs throughout the state, though the magnitude of this regulatory share exhibits substantial variance across markets, generally ranging from 10% to 50%. This result holds even with our more conservative amenity-corrected specification. Interestingly, the land component tends to be small and in some MSAs (e.g., Tallahassee and Tampa), almost negligible; this underscores the importance of separating the implicit value of land from the regulatory compliance value of land. It is not the consumption nor amenity value of land that is driving up prices, but rather the value attached to being able to build on that land.

As expected there is a correspondence between Fig. 5 and Figs. 3 and 4. Generally, in metropolitan areas where the tax/value ratio has grown the most, the tax also explains a relatively large share of house price appreciation. But as noted above, both sets of figures demonstrate that the growth in the regulatory tax has not been uniform across metropolitan areas. The expectation is that the tax/value ratio will increase the most and the percentage of the appreciation attributable to the tax will be the greatest where there exists a confluence of strong demand and highly restrictive regulation. Generally, the results are consistent with this expectation. For example, West Palm Beach displays one of the largest increases in the tax/value ratio and the tax also accounts for a relatively large share of its house price appreciation. This metropolitan area is both heavily regulated (it has the highest value, 7, on the Ilhanfeldt index reported in Table 2) and had the third highest population growth of Florida MSAs from 1990 to 2000 (only Naples and Orlando grew faster). At the other end of the growth (in the bottom five in terms of population growth) and regulatory spectrum (index value of 3) is Lakeland, where the tax/value ratio declined over the decade and the tax accounts for a very small portion of house price appreciation.

As the accuracy of replacement costs are of paramount importance in the calculation of the regulatory tax, a large portion of homes for which these cost estimates are unreliable could possibly pollute our measure of the effect of regulation on housing values. One way to test the robustness of our decomposition results is to eliminate older homes from the sample, as accurately appraising such structures is likely to be far more difficult than estimating replacement costs for newly built homes. To that end, of the homes that sold in both 1995 and 2005, we restrict the sample to homes that were constructed after 1990 and recalculate the appreciation shares. The results of the decomposition exercise using this restricted sample are reported in Table 8. A comparison of the results in Tables 7 and 8 suggests that the decomposition estimates are not very sensitive to the inclusion of older properties in the sample.

6. Conclusion

Home values increased substantially over the decade (1995–2005) analyzed in this paper, and this appreciation was particularly sizeable in the state of Florida. While demand for housing was undoubtedly a driver of the price run-ups, theory suggests that this appreciation could be exacerbated by three broad, supply-sided factors: increasing construction costs, higher land costs and more stringent regulatory environments.

In this paper we applied the regulatory tax methodology of GG and GGS to a rich set of parcel-level tax roll data. These data allowed us to more accurately estimate construction costs and thereby obtain more reliable estimates of the regulatory tax. We find that, regardless of the metropolitan area, the tax is an important component of the price of a home within the state of Florida, although there is considerable variation in the size of the tax component across these areas. These results are in line with those reported by GG and GGS.
Going beyond GG and GGS, we addressed the issue of the importance of the regulatory tax in explaining the substantial rise in housing prices that occurred in Florida over the 1995-2005 time period. We decomposed the overall house price increase into land, materials and regulatory components and found that increases in the regulatory...
tax represents from 5% to 50% of this run-up in house prices, depending on the locality.

Regulation plays an important role in rising housing prices in many of Florida’s metropolitan areas because of two mechanisms. The first comes from the increasing bite of the land development regulations adopted in the early 1990s by local governments in order to implement their comprehensive plans, mandated by the state in the 1985 Growth Management Act. All local governments were required to adopt regulations, but the state gave local governments considerable latitude in their construction. The impact of some of these regulations (e.g., urban growth boundaries) grows over time, as the constraint imposed by the regulation becomes more binding. Hence, even without more regulations, with growing demand more of the increases in housing prices can be attributed to extant regulation. The second mechanism is more direct: there have also been incremental changes in land use regulations in most Florida communities, as more and more have adopted growth boundaries, impact fees, and other land management techniques. This has also contributed to the role played by the regulatory tax in explaining Florida’s run-up in housing prices.

What has happened in Florida is not unique. For example, our count at least 15 other states have passed some form of growth management or smart growth legislation. These laws have increased the degree of land use regulation within these states, allowing for the possibility that housing prices are being pushed upward by the regulatory tax. Future research is needed on states other than Florida in order to document these trends. Where the appropriate data exist, our methodology can be replicated for this purpose.

In closing, we wish to emphasize that our focus has been on the effects that land use regulations have on housing supply. Regulations are also expected to affect housing demand, by improving the quality of local amenities. In order to carefully document the costs and benefits of regulations, future research is needed that looks at regulations’ effects on both sides of the market.

References


Table 8
House price appreciation decomposition: properties built after 1990.

<table>
<thead>
<tr>
<th>MSA</th>
<th>Obs.</th>
<th>Uncorrected Share of appreciation</th>
<th>Amenity correction Share of appreciation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(1) Land (%) (2) Const. (%) (3) Regul. (%)</td>
<td>(4) Land (%) (5) Const. (%) (6) Regul. (%)</td>
</tr>
<tr>
<td>Tallahassee</td>
<td>123</td>
<td>1.7 72.6 25.7</td>
<td>2.5 72.6 24.9</td>
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<tr>
<td>Lakeland</td>
<td>80</td>
<td>12.8 74.2 13.0</td>
<td>12.8 74.2 13.0</td>
</tr>
<tr>
<td>West Palm Beach</td>
<td>98</td>
<td>0.3 49.4 50.3</td>
<td>0.5 49.4 51.1</td>
</tr>
</tbody>
</table>