THE EFFECTS OF IMPACT FEES ON MULTIFAMILY HOUSING CONSTRUCTION

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Abstract

Development impact fees may create more housing opportunities for lower income households within suburban areas if there is a fiscal incentive behind the adoption of exclusionary land use regulations. Using panel data estimation techniques that allow us to control for unobservable heterogeneity and potential endogeneities, we estimate the effects of different types of impact fees on multifamily housing construction using data from Florida counties. Impact fees earmarked for public services other than for offsite water and sewer system improvements are found to expand the stock of multifamily housing construction within inner suburban areas. Water/sewer impact fees, on the other hand, are found to reduce construction throughout the entire metropolitan area.

I. Introduction

The severest criticism of local land use regulations is that, by artificially inflating the cost of housing, they act to exclude lower income households from suburban communities (Bobo, 2000). This exclusion is known to harm these households because suburban communities generally offer them improved social and economic opportunities in comparison to central cities (Ihlanfeldt, 1999)[1]. The exclusionary criticism of land use regulations is also sometimes made on behalf of public servants (teachers, firemen, and policemen), who work in the suburbs but can not afford to live there (Danielson, 1976).

Both federal and state courts have upheld local communities' restrictive zoning ordinances, based on the argument that these laws represent a legitimate exercise of the police power of local government. These rulings have made it extremely difficult to develop federal or state policies that would open up more housing opportunities for lower income households outside of central cities (Schill, 1992).

There are three frequently mentioned motivations that may underlie a suburban government's adoption of exclusionary land use regulations – the externality rationale, the fiscal rationale, and pure prejudice (Ihlanfeldt, 2004). The externality rationale maintains that lower income housing, especially multifamily housing, emits negative externalities that reduce the value of single-family suburban homes. The fiscal rationale asserts that lower income housing does not "pay its own way", in that it raises the costs

[1] The scarcity of suburban low income housing has also exacerbated suburban automobile congestion (Cervero, 1989) and staffing shortages among suburban employers, which adversely affects customer service. Suburbanites therefore also bear costs from low income housing exclusion.

of public services by more than the additional property tax revenue it generates. The desire to exclude low income housing may also stem from racial or class prejudice. What little empirical evidence exists on these alternative motivations suggests that the fiscal motivation is the strongest of the three.[2]

Based on the assumption that the fiscal motivation for exclusion is important, Gyourko (1991), Altshuler and Gomez-Ibáñez (1993), and Ladd (1998) have all suggested that development impact fees may temper exclusionary zoning and other types of exclusionary regulations, allowing more low income housing to be built within suburban areas. Impact fees are one-time levies, predetermined through a formula adopted by the government unit, that are assessed on property developers during the permit approval process. They are used for the provision of public infrastructure services (such as roads, schools, parks and other recreational areas, library services, and water and sewer) that are necessary to serve new development adequately. Impact fees lessen the fiscal deficit imposed on the community by low income housing because a portion of the costs of the new public infrastructure are no longer borne by the average property owner in the form of higher property taxes. Impact fees shift part of the fiscal burden from property owners to developers, who in turn may shift this burden in the long run forward to housing consumers or backward to owners of vacant land (Yinger, 1998; Ihlanfeldt and Shaughnessey, 2004). While roughly a quarter of local governments now use impact fees (Lawhon, 2003), there is no evidence on whether they influence the amount of low income housing being built in the suburbs. From a

[2] For a review of this evidence see Ihlanfeldt (2004).

theoretical perspective, while impact fees may indirectly reduce the total project approval costs imposed on developers by local governments, they also directly increase the developer's building permit fees. The multifamily housing supply curve may shift inward or outward depending on whether the savings in project approval costs are smaller or larger than the fees themselves. Thus, a priori, the effect of impact fees on low income housing construction in the suburbs is ambiguous. Only empirical evidence can resolve the issue of whether impact fees will help or hurt lower income households find affordable housing in the suburbs.

The purpose of this paper is to exploit a unique panel data base on impact fee usage among Florida counties in order to investigate the effects of different types of fees on multifamily housing construction. Separate models are estimated for central cities, inner suburbs, and outer suburbs. The panel nature of the data allow us to exploit a variety of different estimation techniques that control for unobservable factors and possible endogeneities that otherwise may have biased the results. These techniques include fixed effects, random trend, and stock-adjustment models.

The results indicate that impact fees earmarked for making offsite water and sewer system improvements generally reduce multifamily housing construction. In contrast, impact fees designated for other types of infrastructure are found to increase multifamily housing construction within inner suburban areas, but have no effect within central cities or outer suburban areas.

II. Impact Fees and Multifamily Housing Construction

Impact fees affect developers' costs directly by requiring payment of the fee at the time the building permit is issued. Impact fees may also indirectly lower developers' costs by reducing the numerous other costs, besides building permit fees, that developers incur in securing the right to develop. The total costs of obtaining project approval from the local government can be broken down into explicit fees (impact fees, environmental permits, plat application fees, etc.), compliance costs, and time costs. Compliance costs may include payments to engineers, surveyors, attorneys, and others in order to satisfy specific rules and regulations that govern the development.[3] Time costs are incurred because it generally takes months for local governments to complete their review of project proposals. Multifamily housing projects are widely perceived as imposing a fiscal deficit on the community by increasing public service costs by more than the property tax revenue they generate. The fact that multifamily housing is seen as a free rider may explain why relatively little land is zoned for multifamily housing in the suburbs. This increases the compliance and time costs associated with multifamily housing proposals, because an "up-zoning" to higher density is frequently required. Depending on how high they are set, impact fees shift all or a portion of the financing burden from the overall community to the developer, who in the long run may shift the

[3] Compliance costs have received scant attention in studies of the costs of land use regulations, but they may be quite substantial. For example, in Leon County, Florida, the site plan permitting process requires a natural features inventory (which charts all trees and animal features of the site), an environmental impact analysis (which gauges how the proposed development will affect the environment), and a traffic study (which estimates the effect of the proposed development on automobile congestion). Beal (2004) estimates that these requirements add $15,000 in total compliance costs to the cost of obtaining project approval for a limited partition subdivision (i.e., a subdivision of ten lots of less).

fees forward to tenants or backward to landowners.[4] If the fiscal motivation for exclusion is important, communities with impact fees may zone more land for multifamily housing or make variances/rezonings to higher density easier to obtain. Impact fees may therefore generate savings in the project approval process that more than offset the direct costs of the fees themselves.

The above logic, however, applies only to fees that are earmarked by local government for services traditionally funded by property taxes. The major services not funded by property taxes are water and sewer. For these services the financial burden borne by existing residents (in the form of higher base rates) from offsite water/sewer system infrastructure improvements necessitated by new development does not directly depend on the taxable value (per resident) of the development. For example, a high end single-family subdivision and a multifamily housing development may each require an additional pumping station and the same extension of water and sewer lines. Hence, if the goal is to avoid the need for any additional water/sewer infrastructure, all new development would be targeted, not just multifamily housing. However, most communities would not find it advantageous to oppose all new development in order to keep water/sewer user fees low, because development yields benefits (e.g., jobs and shopping opportunities) that exceed the costs of higher water and sewer charges. Water

[4] As discussed more fully below, in Florida impact fees have not been set high enough to cover the full marginal cost of the additional public infrastructure needed by new development.

and sewer impact fees, therefore, impose direct costs on developers, but there is little reason to believe that they affect developers' project approval costs.[5]

In addition to impact fee effects varying by type of fee, these effects are expected to differ among central cities, inner suburbs, and outer suburbs. Within central cities impact fees are not expected to have much affect on multifamily housing project approval costs. For a variety of reasons, central cities are less able to exclude additional multifamily housing than suburban governments. First, relative to middle income homeowners, lower income renters have greater political clout within central cities. Second, because of higher land prices, only multifamily housing may be profitable to build within central cities. Third, in many states including Florida, problems stemming from urban sprawl have led to state governments pressuring central cities to build at higher densities. These three arguments suggest that, regardless of whether impact fees exist, the cost of obtaining approval for a multifamily housing project will be comparatively low within central cities. Therefore, within these areas the direct cost of impact fees are expected to dominate any savings that may result from faster or easier project approval.

In contrast to central cities, exclusionary land use regulations are prevalent in both inner and outer suburban areas. However, due to differences in market conditions, the effects of impact fees on multifamily housing construction are expected to differ

[5] This conclusion is also suggested by the fact that for the average homeowner annual charges for water and sewer services are low relative to his property taxes. Moreover, the connection between water/sewer rates and new development may be less apparent to the average homeowner than that between property taxes and new development, because the free-rider issue has been highlighted by local media as it applies to services financed by property taxes and not water/sewer services financed by user charges.

between these two types of suburbs. The demand for multifamily housing is more elastic within the inner than the outer suburbs. Affordable renting opportunities attract lower income households from the central city to inner suburban areas to a greater extent than to outer suburban areas because lower-skilled jobs are relatively concentrated in the inner suburbs and public transportation is more accessible. In addition, as is well known from the housing mobility literature, when households move within urban areas they tend to search close to where they lived before. Lower-income central city households may cross over the city boundary and search within the inner suburbs, but are much less likely to search in the outer suburbs. More elastic demand within the inner suburbs translates into larger changes in multifamily housing construction, given an impact fee induced shift in the multifamily housing supply curve. It is also the case that communities in the outer suburbs are more homogeneous with respect to race and class; hence, income and racial prejudice may continue to result in multifamily housing exclusion, even if impact fees mitigate the fiscal motivation.

In summary, the above arguments yield two predictions regarding the effects of impact fees on multifamily housing construction: 1) water/sewer impact fees will decrease construction in both central city and suburban areas, and 2) non-water/sewer impact fees may expand the stock of multifamily housing, with the greatest likelihood of expansion coming within inner suburban areas.

III. The Panel Data Set

A complete history of impact fee rates was obtained by contacting county planning offices for all Florida counties. Our empirical investigation uses 33 of the 36 metropolitan counties in Florida that have ever imposed impact fees on multifamily housing developments.[6] Impact fees in Florida are county-wide, but some cities also impose their own fees on top of those charged by the county. The city fees are in all cases small relative to county totals. Fees are used to fund a wide variety of government services, with fees for water/sewer, schools, and roads being the largest and most popular.[7] Impact fees levied on multifamily housing are assessed on each apartment and may increase with the size and number of bedrooms of the apartment. Our impact fee variables – one for water/sewer and one for all other services – are based on a 1,000 square foot apartment with two bedrooms. Table 1 lists per apartment real impact fees (in 2003 dollars) for each county for the first (1996) and last (2003) years of fees used in estimating our models. The largest water/sewer fee is found in Indian River County in 1996 ($4,863 per apartment), while the largest total sum of fees for other services is found in Martin County in 2003 ($5,072 per apartment). Over the years covered by our panel, real water/sewer fees increased in 12 counties, decreased in 19 counties, and did not exist in 2 counties. For non-water/sewer fees, real values increased in 18 counties,

[6] Using the most recent census definitions, there are 38 metropolitan counties in Florida. Clay and Jefferson Counties have not charged either type of impact fee and are dropped. Duval is dropped because the County and central city are consolidated governments, making the central city vs. inner suburban area breakdown we describe below impossible. Saint Lucie County is dropped because historical water/sewer impact fee rates are unobtainable. Finally, Alachua County is dropped due to a lack of consistency across tax rolls in the measurement of the square footage of multifamily housing properties.

[7] Impact fee ordinances in Florida must satisfy the "rational nexus" test, which requires (1) a clear connection between new growth and the need for new capital facilities, (2) fees that are proportional to the costs of providing the facility, and (3) the payer of the fee benefit from the new public facilities.

decreased in 9 counties, and did not exist in 6 counties. As described below, estimates of the effects of impact fees on multifamily housing construction are based only on variation in fees within (and not between) counties; hence, the fact that this variation is nontrivial will help provide more efficient estimates.

Although some Florida counties first adopted impact fees back in the 1980s, our panel data base is limited to those years for which we were able to obtain the property tax rolls of the individual counties from the Florida Department of Revenue – 1995 to 2004. From the rolls we were able to calculate the multifamily housing stock in total square footage as of January 1 of each year. The tax roll data also include the two most recent sales prices for each property and the year of each sale. From these data individual county repeat-sales price indexes were estimated for vacant residential land and multifamily housing. The construction of these indexes first involved estimating the standard repeat-sales model:

$$Ln\left(\frac{P_{i,t}}{P_{i,t-n}}\right) = \sum_{k-1}^{T} \beta_k D_{i,k} + \varepsilon_{i,t,t-n} \tag{1}$$

Where $P_{i,t}$ is the most recent selling price of property i at time t; $P_{i,t-n}$ is the previous selling price of property i at time t-n; β_k is the logarithem of the cumulative price index in period t; $D_{i,k}$ is a dummy variable which equals -1 at the time of the initial sale, +1 at the time of the second sale, and 0 otherwise; and $\varepsilon_{i,t,t-n}$ is the regression error term. The estimated coefficients of (1) were then used to calculate annual appreciation rates. Finally, the nominal price of a square foot of multifamily housing and an acre of vacant residential land were computed for each year by starting with average values in 2003 (calculated from the tax rolls) and predicting values for previous years using the estimated annual appreciation rates.

The final data item used to complete our panel are the Means City Construction Cost Indexes. These indexes are available annually for 16 Florida cities. For each year of the panel each county was assigned the annual index value of the closest city.[8]

The 33 metropolitan counties included in our data base are divided into central counties and outer suburban counties (See Table 1). Central counties contain a central city, while outer suburban counties do not. Central counties are further divided into central city areas and inner suburban areas. Central city areas may include more than one central city.[9] The models described below investigate the effects of impact fees on multifamily housing construction and are estimated separately for the central city areas, inner suburban areas, and outer suburban areas.[10]

IV. Estimated Models

A change in the multifamily housing stock occurs when there is a difference between the equilibrium stock and the actual stock. If the equilibrium stock is less than the actual stock, the actual stock will shrink over time as rental units are converted to alternative land uses. Alternatively, if the equilibrium stock is larger than the actual stock, the stock will expand due to new apartment construction. Due to adjustment lags,

[8] Means includes the cost of materials, labor, and equipment rental costs.
[9] Of the 33 counties, 19 are central counties and 14 outer suburban counties. Of the central counties, 6 have more than one central city.
[10] According to the 2000 Census of Population and Housing, 21.5% of Florida's metropolitan population live in central cities, 59.6% live in inner suburban areas, and 19.0% live in the outer suburbs.

a gap between the equilibrium and actual stock of multifamily housing is slowly eliminated over a number of years.

Our theoretical discussion suggests that a change in impact fees may alter the equilibrium stock by shifting the supply curve, thereby inducing a change in the actual stock. With our panel data we estimate three different models. As outlined below, all models are estimated after first differencing the data to eliminate area-specific fixed effects. Hence, we relate changes in the multifamily housing stock to changes in the real value of impact fees within areas. While a number of counties adopted either water/sewer fees or non-water/sewer fees for the first time during the years covered by our panel, most of the variation in impact fees within counties comes from three other sources. First, there are increases in non-water/sewer fees as the number of services funded by impact fees grows over time. Second, fees earmarked for individual services have increased to cover a larger portion of the costs of new public infrastructure. As impact fees have gained acceptance, they have been adjusted upward to more fully reflect marginal costs, but the common perception is that most individual fees remain well below the infrastructure costs of the services that they help fund.[11] Impact fees have therefore reduced, but not eliminated, the dependence on the property tax as a source of funding for public infrastructure needed for new development. Finally, the

[11] The Florida Legislative Committee on Intergovernmental Relations (LCIR) addressed this issue in their 1986 report, Impact Fees in Florida. The report cites two estimates of the average marginal cost of infrastructure necessitated by a new single-family home in Florida; $10,865 from a 1973 study and $22,000 from a 1985 study. They conclude that impact fee levels do not come close to reaching this level in any location in Florida. Bringing these figures forward to current dollars and comparing them to total impact fee levels reveals this is still true today. While marginal infrastructure costs may be somewhat lower for multifamily than single-family housing units, fees on multifamily units are still well below the full marginal cost for all Florida Counties.

real value of fees can change over time within counties due to changes in the price deflator (i.e., the CPI).

To be clear, we are not investigating how the multifamily housing stock might change if an area adopted optimal impact fees set to cover the full marginal cost of the additional public infrastructure necessitated by new development. Rather, we are exploring how within-area changes in the real value of fees (which can be positive or negative) effect changes in the multifamily housing stock within these same areas. As fees change builders' costs are directly affected by the fee payments themselves. Fee changes also alter (but do not eliminate) the fiscal deficit imposed on existing residents by new multifamily development. Our central hypothesis is that a change in this fiscal deficit may lead to a change in the project approval costs borne by developers, resulting in an increase in fees causing an increase in the multifamily housing stock. If we find such an effect, this would suggest that the adoption of optimal fees would also have this effect *a fortiori*. However, if we do not find a positive effect, this would not rule out the possibility that optimal fees would produce such an effect. For example, it may be necessary to completely eliminate the negative externality imposed on existing residents by new multifamily development before restrictions on multifamily housing construction are eased by the community.

After differencing the data and using lagged levels of the explanatory variables as instrumental variables in estimating one of our three models, our ten year panel

(1995-2004) yields seven data points for each County. For consistency, these seven data points are used to estimate all three models.[12]

Our first model is a two way (time and space) fixed effects model:

$$\Delta S_t = \alpha_i + \gamma_t + \beta_0 * WSIF_{t-1} + \beta_1 * NWSIF_{t-1} + \varepsilon_{it} \qquad (2)$$

Where ΔS_t is the annual change in the total amount of multifamily housing square footage within the area (central city, inner suburbs, outer suburbs) over year t; WSIF and NWSIF are real water/sewer impact fees and real non-water/sewer impact fees on the standard apartment, respectively; α_i and γ_t are fixed effects for area and time, respectively; and ε_{it} is the idiosyncratic error term. Area fixed effects account for unobserved heterogeneity across areas related to multifamily housing construction and time effects control for factors that uniformly affect all areas over time. An important advantage of (2) is that impact fees are allowed to depend on area levels of multifamily housing stock changes, thus mitigating the potential for endogeneity bias. Equation (2) is estimated by OLS, after first differencing the variables in order to eliminate the area fixed effect (α_i).

The second model we estimate adds an area specific time trend (g_i) to equation (2):

$$\Delta S_t = \alpha_i + \gamma_t + g_i t + \beta_0 * WSIF_{t-1} + \beta_1 * NWSIF_{t-1} + \varepsilon_{it} \qquad (3)$$

[12] Also in the interest of consistency across models, we use the change in impact fees as our explanatory variable in all three models. While this is the correct variable in our third model (stock-adjustment), it could be argued that in our first two models (fixed effects and random trend) the correct variable is the change in the change in impact fees. This follows because it is changes in impact fees that induce disequilibrium and cause changes in the stock. After differencing, the impact fee variable would be a double difference. However, in our data the difference and the double difference are essentially the same variable, with the intra-county correlation between the two variables generally being .8 or higher.

This model, which is referred to as the random trend model, allows each area to have its own time trend in multifamily housing construction. The area-specific trend is an additional source of heterogeneity. The random trend model allows impact fees to depend on area-specific trends in multifamily housing construction, in addition to the level of multifamily housing construction. The model is estimated by first differencing to eliminate α_i and then fixed effects are applied to the differences – i.e., n-1 area dummy variables are added to the model.

A possible criticism of models (2) and (3) is that there may be other variables, in addition to impact fees, that vary within areas over time that affect multifamily housing construction. If movements in these variables are correlated with changes in impact fees, the estimated effects of impact fees on multifamily housing construction may be biased. However, omitted variable bias is likely unimportant given our data and approach. Bias will only result if the excluded variable commonly varies within areas, this variation is commonly correlated with the variation in impact fees within areas, and the variable has a common important effect on multifamily housing construction across areas, *after controlling for fixed effects, random growth trends, and aggregate time effects in the specification*. While unlikely, omitted variable bias is still possible. We therefore also estimated a standard stock-adjustment model, including space and time fixed effects:

$$\Delta S_t = \alpha_i + \gamma_t + \beta_0 * WSIF_{t-1} + \beta_1 * NWSIF_{t-1} + \beta_2 * LP_{t-1} + \beta_3 * HP_{t-1} + \beta_4 * CC_{t-1} + \beta_5 * S_{t-1} + \varepsilon_{it} \quad (4)$$

where LP, HP, and CC are land price, multifamily housing price, and construction costs, respectively, as defined in Section III. These variables, along with impact fees, are assumed to determine the equilibrium amount of multifamily housing. The estimated coefficient on the lagged value of the stock (β_5, which is expected to be negative) represents the rate at which the stock adjusts to the new equilibrium. The price and cost variables enter as real values, having been deflated by the CPI for the southeast region. Like impact fees, they are measured at the county level. The lagged value of the multifamily housing stock, however, is measured separately for each area type (i.e., for a central county, S_{t-1}, is measured separately for the central city and the inner suburbs).[13]

Once again, equation (4) is estimated in first differences in order to eliminate α_i. After differencing, ΔS_t (= $S_{t-1} - S_{t-2}$) appears on the right hand side of (4). By construction, ΔS_{t-1} is not strictly exogenous, which will result in (4) yielding inconsistent estimates if estimated by OLS. Strict exogeneity is stronger than assuming contemporaneous exogeneity since it implies that explanatory variables in each time period are uncorrelated with the idiosyncratic error (ε_{it}) in each time period: E ($X_{is}^{'} \varepsilon_{it}$) = 0, s, t = 1,…, T. Strict exogeneity fails in (4) since ΔS_{t-1} and ε_{it} are correlated. A simple approach to consistent estimation is to instrument ΔS_{t-1} with lagged levels of the explanatory variables, beginning with t-2. We choose lagged levels of the stock, housing price, and construction costs as our set of instrumental variables. Two statistics

[13] Note that (4) does not include a variable measuring removals from the stock due to depreciation or scrapage, because this cannot be measured. However, if removals are fairly constant within counties over time, they are captured by the area fixed effects. If removals vary within counties over time, we have no reason to believe that they would be correlated with impact fees.

are used to check the validity of these instruments. F-statistics are used to test whether the instruments are jointly significant in a reduced form regression of the change in the multifamily housing stock on all of the exogenous variables. To be valid, the instruments should be jointly significant in explaining the endogenous variable. The other statistic is the chi-squared statistic of the standard overidentification test, which tests the null hypothesis that all instrumental variables are uncorrelated with the error term of the structural model. As reported in the results tables discussed below, for the model estimated for each of the three areas the instruments are jointly significant in the reduced form regression.[14] Also, the overidentification test statistic indicates that the null hypothesis that all instrumental variables are uncorrelated with the structural error cannot be rejected at conventional levels of significance. We also tested the strict exogeneity of the other explanatory variables in all three of our models (i.e., impact fees in all three models and the price and cost variables entering the stock-adjustment model). Wooldridge (2002, Chapter 11, page 285) suggests a test for strict exogeneity that involves adding contemporaneous and/or leading levels of the explanatory variables as regressors to our estimated first differenced models. We tried various combinations of these level variables and they never obtained significance based upon F tests; hence, we were unable to reject the null hypothesis of strict exogeneity.

[14] The instruments are jointly significant at the one percent level for the central city and outer suburban area models. For the inner suburban model the instrumental variables are significant at the six percent level. The fact that the instruments are less significant in the reduced form model estimated for the inner suburban stock-adjustment model may explain the larger difference in the estimated coefficient on water/sewer impact fees between the stock-adjustment model and the other two estimated models.

V. Results

The estimated effects of impact fees on multifamily housing construction are reported in Tables 2, 3, and 4 for central city, inner suburban, and outer suburban areas, respectively. These effects are strongly consistent with the predictions developed in Section II. Across all three area types and all three estimators, water/sewer impact fees are found to reduce multifamily housing construction. Based upon standard errors robust to heteroskedasticity and serial correlation, these estimates are statistically significant in 7 of the 9 cases (in one of the two insignificant cases, the effect is just marginally insignificant).[15] For each area type, the size of the estimated coefficient is highly similar across the three alternative estimators, with the exception of the stock-adjustment estimate for inner suburban areas (which is markedly smaller in absolute value than the estimates yielded by the fixed effects and random trend models). Averaging across estimators, the average coefficients for central cities, inner suburbs, and outer suburbs are -1202, -3770, and -1317, respectively.[16] These estimates indicate the $1 of additional water/sewer impact fees reduce multifamily housing construction in these respective areas by 1202, 3770, and 1317 square feet in the year following the increase in impact fees. The larger effect registered for the inner suburbs is consistent with our argument that the elasticity of demand for multifamily housing is relatively high within these areas.

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[15] Because we are controlling for both space and time fixed effects, it is reasonable to be somewhat more liberal in what is considered to be significant p values in determining statistical significance. Hence, an estimated parameter is considered to be statistically significant if the p value is .10 or lower, by a two-tailed test.

[16] In the case of the inner suburbs, estimated coefficients are averaged over just the fixed effects and random trend models.

The results for non-water/sewer impact fees contrast sharply to those obtained for water/sewer impact fees. For central city and outer suburban areas estimated effects are highly insignificant (with estimated standard errors exceeding estimated coefficients in all cases). However, for inner suburban areas, non-water/sewer impact fees have positive, statistically significant effects on multifamily housing construction across all three estimators. The magnitudes of the estimated coefficients are again highly similar, ranging between 2333 and 2801. The average coefficient indicates that multifamily housing construction will increase by 2581 square feet in the year after a $1 increase in non-water/sewer impact fees.

The estimated coefficients on the lagged value of the stock in the stock-adjustment models are all negative and lie between -.2 and -.6, implying dynamic stability. However, these coefficients are not statistically significant. The other variables entering the stock-adjustments models – real values of land price, housing price, and construction costs – are also uniformly insignificant. In the case of the construction cost index, its real value displays little variation within counties over the time period covered by our panel. The real values of multifamily housing price and land price do increase for most counties, but there is high collinearity between these two variables (the simple correlation coefficient exceeds .9 for most counties). The insignificant results obtained for the control variables in the stock-adjustment models are therefore not surprising. The finding, however, that the impact fee results are robust to the inclusion of these variables lends support to our belief that omitted variables have not biased the results yielded by the fixed effects and random trend models.[17]

To further assess the quantitative impacts of the estimated impact fee effects on multifamily housing construction, we used the average estimated coefficients reported above to calculate short-run elasticities (at the point of means for each area type). These elasticities measure the immediate response of construction to higher impact fees. We also calculated long-run elasticities based upon the estimated impact fee and stock coefficients obtained from the stock-adjustment models. The long-run elasticity measures the percentage change in the equilibrium stock of multifamily housing in response to a one percent change in impact fees. Due to the imprecision in the estimated stock coefficients, these elasticities should only be interpreted as suggestive of the true long-run equilibrium effects.

The calculated elasticities are reported in Table 5. The short-run elasticities for water/sewer impact fees range between –6 and –8 across the three area types, indicating that increases in these fees have strong negative effects on multifamily housing construction. As discussed in Section II, these fees impose direct costs on developers

[17] Another possible omitted variable is suggested by the possibility that developers anticipate increases in impact fees and attempt to build before the fee increase is imposed. The reduction in construction that we observe in the year after an increase in water/sewer fees may therefore simply represent construction that occurred in the previous year. To investigate this, we added to the random trend models (equation 3) impact fee values for January 1 of the next year. To illustrate, for construction observed during 1999, both the January 1, 1999 and January 1, 2000 fees were included. For central cities and outer suburbs, the leading values of impact fees are not statistically significant and their inclusion has little effect on the lagged value results for either the water/sewer or non-water/sewer variables. However, for inner suburbs there is weak evidence that the anticipation of impact fees does speed up development. The estimated coefficient on the leading value of water/sewer fees is 3582 (t statistic = 1.6). The estimated coefficient on the lagged value of water/sewer fees falls from -4475 (t=4.0) to -3075 (t=3.0). The estimated coefficient on the leading value of non-water/sewer fees is not significant and the lagged value remains positive and statistically significant (β=2061, t=2.34) after the inclusion of the leading values.

and probably yield little benefit in the form of project approval cost savings. They therefore act as a tax on development, which unambiguously shifts the supply curve upward. The only short-run elasticity calculated for non-water/sewer impact fees is for the inner suburbs, because it is only for this area type that these fees are found to have a statistically significant impact on construction. Here the elasticity is also large in magnitude (4), indicating that non-water/sewer impact fees have a strong positive effect on multifamily housing construction in the short-run. Apparently, increases in these fees reduce project approval costs by more than the fees themselves, resulting in a downward shift in the supply curve.

The long-run elasticities also suggest that changes in impact fees have nontrivial effects on the long run equilibrium stock of multifamily housing. For water/sewer impact fees they range between -.3 (inner suburbs) to –1.2 (central cities). The long-run elasticity with respect to non-water/sewer impact fees within inner suburban areas is .6.

Another method for gauging the magnitudes of the estimated effects is to consider what would happen within an actual county if it was to increase its impact fees. The inner suburbs of Pinellas County contain roughly the average amount of multifamily housing square footage found within inner suburban areas throughout the state. On January 1, 2004 suburban Pinellas had 37.7 million square feet of multifamily rental housing. Our panel data show that when counties increase either their water/sewer or non-water/sewer impact fees, in real terms the increase on average is about $250 per apartment. What would happen to the multifamily housing stock in suburban Pinellas County if it increased both its water/sewer and non-water/sewer impact fees by $250?

According to our average estimates, the increase in the water/sewer fee would reduce the additional multifamily housing stock built in the short-run by 942,500 square feet, while the increase in the non-water/sewer fee would expand the stock by 645,250 square feet. The former change represents a 2.5% decline in Pinellas' stock, while the latter change reflects a 1.7% increase in its stock.

According to the stock-adjustment model estimated for inner suburban areas, the long-run equilibrium changes would be about 3.7 times larger than the above short-run changes. In the long-run therefore, the increase in the water/sewer fee (non-water/sewer fee) would reduce (increase) the growth in the stock by 9.3 (6.3) percent.

Additional perspective on these percentage changes results from accessing their impact on the number of multifamily rental units and the number of people living within these units. Assuming the size of the typical unit is 1,000 square feet and houses two residents, the increase in the non-water/sewer fee would increase construction in the short-run by roughly 516 apartments (1032 residents).[18] We consider this change nontrivial and plausible in magnitude. The long-run effect (which, to reiterate, is only suggestive) increases the number of renters by about 3818 people, which equals .68% of suburban Pinellas' 2000 Census population of 564,463.

[18] This calculation also assumes only 80% of the reported total square footage is leaseable space. This adjustment is made since reported total square footage includes leasing offices, common areas (i.e., clubhouses, workout facilities, and entry areas), and maintenance/storage facilities.

VI. Conclusion

Dating back to the Los Angeles Watts riots in the 1960s, advocates for the inner city poor have emphasized the need to open up more housing opportunities for lower income households within suburban areas. Suburban communities, however, have offered stiff resistance, and have generally succeeded in excluding low income housing from being built within their borders. This has harmed not only the poor but also public servants who cannot afford to live in the same suburban communities where they work.

One of the motives underlying the desire to exclude low income housing from the suburbs is thought to be fiscal in nature, since low income housing generates increased public service costs that exceed additional property tax revenues. The existence of a fiscal deficit suggests that impact fees, which depending on their magnitude shift all or a portion of the financial burden of new development away from existing residents, may lessen exclusion and allow more low income housing to be built within suburban areas.

Our results suggest that non-water/sewer impact fees do increase the amount of multifamily housing that gets constructed within inner suburban areas, where a majority of the population living within Florida's metropolitan areas is located. Water/sewer impact fees, on the other hand, result in less construction throughout the metropolitan area. Our explanation for these contrasting results is that only non-water/sewer fees reduce the developer's cost of obtaining project approval by enough to overcome the costs of the fees themselves.

From a policy perspective the implication of our results is clear – if the goal is to increase the stock of multifamily housing within inner suburban areas, states should encourage their communities to adopt non-water/sewer fees but discourage the use of water/sewer fees. Perhaps the best approach would be to adopt non-water/sewer fees but continue to incorporate the costs of offsite water/sewer system improvements within the base of user fees.

Of course, there may be other approaches, besides impact fees, toward reducing the fiscal incentive for the exclusion of low income housing from the suburbs. Any approach that reduces a reliance on the property tax as a means of financing the public service costs of new development may work.[19] However, because impact fees are specifically intended for new development to pay its own way, alternatives to fees may be second-best in nature.

To our knowledge, we have offered the first available evidence on whether impact fees help or hurt lower income households' quest for affordable suburban housing. Clearly, much more research on this important topic is needed, especially for other states. On our own research agenda is an extension of the present work to determine whether impact fees affect the number of single-family starter homes that get built within suburban areas.

[19] For example, as noted by Ladd (1998), court-ordered reforms that force states to provide more aid to equalize education spending may reduce some of the relative disadvantage of admitting poor households.

References

Altshuler, Alan A. and Jose´ A. Gomez-Ibáñez. 1993. *Regulation for Revenue: The Political Economy of Land Use Exactions.* Washington D.C.: Brookings Institution and Cambridge, MA: Lincoln Institute of Land Policy.

Beal, Mary. 2004. "A Comparison of Land Use Regulation Between Leon and Wakulla Counties". Policy Brief #12. DeVoe L. Moore Center. College of Social Sciences. Florida State University.

Bobo, B.F. 2001. *Locked In and Locked Out: The Impact of Urban Land Use Policy and Market Forces on African Americans.* Westport: Praeger.

Cervero, Robert. 1989. "Jobs-Housing Balancing and Regional Mobility". *American Planning Association Journa.* Spring, 136-150.

Danielson, Michael N. 1976. "The Politics of Exclusionary Zoning in Suburbia". *Political Science Quarterly*, 91(1), 1-18.

Gyourko, Joseph. 1991. "Impact Fees, Exclusionary Zoning, and the Density of New Development". *Journal of Urban Economics*, 30, 242-256.

Ihlanfeldt, Keith R. 2004. "Exclusionary Land-use Regulations within Suburban Communities: A Review of the Evidence and Policy Prescriptions". *Urban Studies*, 41(2), 261-283.

Ihlanfeldt, Keith R. and Timothy M. Shaughnessy. 2004. "An Empirical Investigation of the Effects of Impact Fees on Housing and Land Markets". *Regional Science and Urban Economics*. 34(6), 639-661.

Ihlanfeldt, Keith R. 1999. "The Geography of Economic and Social Opportunity in Metropolitan Areas". In A. Altshuler, W. Merril, H. Wolman, and F. Mitchell. (eds). *Governance and Opportunity in Metropolitan America*. Washington D.C.: National Academy Press, pp. 213-252.

Ladd, Helen F. 1998. *Local Government Tax and Land Use Policies in the United States: Understanding the Links*. Cambridge, MA: Lincoln Institute of Land Policy.

Lawhon, Larry L. 2003. "Development Impact Fee Use By Local Governments". *Municipal Year Book*. 27-31.

Schill, Michael H. 1992. "Deconcentrating the Inner City Poor". *Chicago-Kent Law Review*. 67(3), 795-853.

Wooldrige, J. 2002. *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: The MIT Press.

Yinger, J. 1998. "The Incidence of Development Fees and Special Assessments". *National Tax Journal*. 51, 23-41.

Table 1
Real Impact Fees Per Apartment For Florida Metropolitan Counties
(2003 $)

County	Central City (CC)/ Outer Suburbs (OS)[a]	Not Water/Sewer[b]		Water/Sewer	
		1996	2003	1996	2003
Baker	OS	$0	$0	$1186	$1020
Bay	CC	0	0	2037	1752
Brevard	CC	570	895	4561	3921
Broward	CC	1562	1978	2422	2027
Charlotte	CC	2243	1928	4042	3788
Collier	CC	3179	4108	1779	3778
Dade	CC	1832	3515	1091	1424
Escambia	CC	0	0	1689	2149
Gadsden	OS	0	0	0	459
Gilchrist	OS	0	1005	0	0
Hernando	OS	2353	2134	1512	1331
Hillsborough	CC	1591	1368	2864	2462
Indian River	OS	773	846	4863	3550
Lake	OS	746	1604	2410	2179
Lee	CC	2002	3565	2111	2345
Leon	CC	196	0	3479	2742
Manatee	CC	1309	1488	2711	2470
Marion	CC	435	803	2467	2121
Martin	OS	2035	5072	1482	1835
Nassau	OS	713	709	1383	1189
Okaloosa	CC	0	0	2372	2039
Orange	CC	1967	3727	3222	3042
Osceola	OS	1278	1637	3303	2960
Palm Beach	CC	2439	4642	2767	2379
Pasco	OS	2090	2533	1403	1152
Pinellas	CC	1169	1005	1876	2018
Polk	CC	646	873	2034	2811
St. Johns	OS	2105	1845	3318	3386
Santa Rosa	OS	0	0	1119	2200
Sarasota	CC	2524	2559	3398	3113
Seminole	OS	1867	1605	3615	3108
Volusia	CC	3705	3114	3021	3323
Wakulla	OS	669	1271	0	0

Table 1 (continued)

[a]Central counties are those that contain a central city. Outer suburban counties are metropolitan counties that do not contain a central city.

[b]"Not Water/Sewer" refers to the sum of all impact fees for services other than water and sewer. “Water/Sewer” refers to the sum of impact fees earmarked for water and sewer offsite infrastructure.

Table 2
Results for Central Cities

	(1) Fixed effects	(2) Random trend	(3) Stock-adjustment
Impact fees, not water/sewer	-13	-81	74
	(497)[a]	(587)	(510)
Impact fees, water/sewer	-1152**	-1100**	-1356*
	(492)	(526)	(822)
Land price index			-.85
			(26)
Construction index			132311
			(228746)
Multifamily price index			32569
			(50465)
Multifamily stock			-.18
			(.28)
R-square	.108	.125	.227
Observations	118	118	118
F-tests on IVs[b]			4.42
			[.001][c]
Over-id test			.37
			[.992]

[a]Robust standard errors in parentheses.
[b]Identifying instruments are lagged values of multifamily stock, land price, multifamily price, and construction cost index.
[c]p-values in brackets.
*, **, *** indicate significance at the 10%, 5%, and 1% levels by a two-tailed test, respectively.

Table 3
Results for Inner Suburbs

	(1)	(2)	(3)
	Fixed effects	Random trend	Stock-adjustment
Impact fees, not water/sewer	2333*	2801**	2610*
	(1372)[a]	(1205)	(1529)
Impact fees, water/sewer	-3064***	-4475***	-1137
	(820)	(1126)	(1739)
Land price index			32.3
			(82.4)
Construction index			-85976
			(282819)
Multifamily price index			-62542
			(70399)
Multifamily stock			-.27
			(.39)
R-square	.162	.251	.344
Observations	118	118	118
F-tests on IVs[b]			2.20
			[.060][c]
Over-id test			4.61
			[.330]

[a]Robust standard errors in parentheses.
[b]Identifying instruments are lagged values of multifamily stock, land price, multifamily price, and construction cost index.
[c]p-values in brackets.
*, **, *** indicate significance at the 10%, 5%, and 1% levels by a two-tailed test, respectively.

Table 4
Results for Outer Suburbs

	(1)	(2)	(3)
	Fixed effects	Random trend	Stock-adjustment
Impact fees, not water/sewer	-717	-682	-878
	(783)[a]	(948)	(1844)
Impact fees, water/sewer	-1194	-1508*	-1250*
	(907)	(864)	(697)
Land price index			4.7
			(80)
Construction index			-34227
			(175483)
Multifamily price index			-28957
			(25832)
Multifamily stock			-.57
			(.86)
R-square	.111	.116	.474
Observations	111	111	111
F-tests on IVs[b]			5.35
			[.006][c]
Over-id test			3.12
			[.077]

[a]Robust standard errors in parentheses.
[b]Identifying instruments are lagged values of multifamily stock, land price, multifamily price, and construction cost index.
[c]p-values in brackets.
*, **, *** indicate significance at the 10%, 5%, and 1% levels by a two-tailed test, respectively.

Table 5
Elasticities of Multifamily Housing Construction with Respect to Impact Fees

	(1)	(2)	(3)
	Central Cities	Inner Suburbs	Outer Suburbs
Impact fees, not water/sewer			
Short-run elasticity[a]	I[c]	4.28	I
Long-run elasticity[b]	I	.59	I
Impact fees, water/sewer			
Short-run elasticity	-5.84	-7.86	-7.87
Long-run elasticity	-1.18	-.32	-.88

[a]The average estimated coefficient on the impact fee times the ratio of the mean impact fee to the mean change in square footage of multifamily housing.
[b]The estimated coefficient on the impact fee from the stock-adjustment model divided by the estimated coefficient on the multifamily stock times the ratio of the mean impact fee to the mean change in square footage of multifamily housing.
[c] "I" indicates estimated impact fee coefficient not significantly different from zero.