

The Fiscal Impact of Alternative Land Uses in Macon County

This paper uses the hedonic method to analyze the effect of land use change on local government property tax revenues and costs of property tax-supported services. A statistical model estimates the property value for alternative land uses which is used with the current property tax rate to estimate tax revenue for a typical parcel in each of three land use categories: residential, commercial, and agriculture/open-space. The per parcel average cost of tax supported services is calculated from county expenditures. Using these values a revenue to cost ratio is calculated for each land use and a scenario assuming the development of thirty acres of open space is discussed.

Jeremy L. Jones and Susan B. Kask

I. INTRODUCTION

Rural areas in the U.S. are continuing to change rapidly with continued population and economic growth and restructuring. With this rapid growth come changing land uses and new populations in rural communities pressuring local governments to provide new services. However, sufficient revenues may not be available to support needed or wanted services. Therefore, an important element in the planning process for local government is to monitor the fiscal vitality of a community with respect to the revenues needed and the services required. This study develops a hedonic model that can help a community understand the fiscal impact of alternative land uses.

Fiscal impact studies have been conducted in communities for many years (Margolis, 1956; Burchell and Listokin, 1995). Studies have often found that residential development imposes greater costs to a community than the tax revenues they generate (Brabec, 1992; Miller, 1992; Burchell and Listokin, 1995). Furthermore, studies have found that a community can potentially maintain current tax rates, or mini-

mize tax increases, by maintaining land as open space rather than promoting development. As communities become more computerized and the need for understanding how they are changing increases, fiscal studies are becoming an increasingly important tool for community planning. (Fausold and Lilieholm, 1996)

Fiscal impact studies can demonstrate whether tax revenues will shift uniformly with government expenditures as land usage changes. When more taxes are necessary, but the campaign promise of "no new taxes" looms over officials' heads, the logical alternative often seems to be more development to increase the tax base. Common sense would seem to dictate that more businesses and more residents would constitute more tax revenues. However, time after time, fiscal impact studies have shown that while more commercial and residential development does increase the tax base, it also

Jeremy L. Jones is a research assistant in the Economics, Finance and International Business department at Western Carolina University. Susan B. Kask is in the Business and Economics department at Warren Wilson College, and can be reached at skask@warren-wilson.edu.

increases the demand for schools, public works, road maintenance, emergency services, and local government. In other words, service expenditures may exceed the additional revenues generated for the community

Results from these fiscal impact studies do not suggest that development is bad. Development certainly has its advantages such as spurring higher wages, providing jobs, and more and improved public services. Instead these studies simply disprove the myth that a larger tax base will ease the tax burden for the individual taxpayer. If development is to be pursued as a local government policy, it should not be done to solve a tax crisis.

Typically, fiscal impact studies analyze the impact of a particular project, or change in a particular land parcel (Oakland and Testa, 1995). Some studies use a municipal approach for analyzing revenues and expenditures. This paper uses the hedonic method to estimate property values, and thus tax revenues. The models are applied to Macon County, North Carolina.

Section 2 discusses the hedonic method and the sample properties used for the study. Section 3 describes the property value models and the results used for the fiscal impact analysis. Section 4 presents the cost of services allocation. Section 5 provides the fiscal impact analysis with the scenario analysis. Policy implications are discussed in Section 6. A summary and final conclusions are given in Section 7.

II. METHOD, PILOT SITE AND SAMPLE

Method

Two approaches are generally used for fiscal impact analysis: the Municipal Approach (hereafter MA) and the Single Property Approach (hereafter SPA)¹. This study uses a variation of the SPA method for two reasons: the availability of data by parcels and the potential for this approach to better differentiate the impact for different types of development,

e.g., cluster versus sprawl residential development. The SPA approach typically analyzes only a single property; however, this study uses a sample of single properties to develop a statistical model that estimates property value for a parcel using property characteristics. This hedonic approach is commonly used to analyze property values in the economic literature (e.g. Parsons, 1992; Kask and Maani, 1992) and is applied similarly in this paper. The approach provides results similar to the MA approach in that it evaluates an average property rather than a particular property. However, it does so capturing the complexities of particular properties, a feature lost in the MA approach. Using the hedonic approach, property values can be estimated for particular parcels thus capturing the benefits of the SPA approach. Cost of services in this study are allocated across land uses and estimated on a per parcel basis. Revenues received are compared to cost of services per parcel indicating whether a type of land use imposes on average additional costs to a community over the tax revenues collected.

In this study only property tax revenues are used to calculate the fiscal impact revenue-cost ratio. Although it is true that as population increases we expect sales revenues and other revenue sources (state allocations, etc.) to increase for the county, it is not possible to connect these types of revenues received to a parcel of property, or a type of land use. Therefore, this study subtracts the user-fee based services, services funded by other sources of revenue such as grants and state allocations, and sales² tax revenue-supported services from the county budgets. Instead, this study focuses specifically on the county property tax-supported services in the cost estimates.

The revenue cost ratio uses an average cost per parcel compared to average tax revenue. This is done primarily due to data constraints. Typically, economists argue that marginal costs and marginal revenues should be compared to ensure efficient resource allocation

for each decision. Although we can use the estimated property value equations to calculate marginal revenue from a change land use for a single parcel, we have no means to estimate the marginal cost. This, of course, could be done on a case-by-case basis by county officials. If marginal cost and average cost are similar then the results from this study are equivalent to a marginal analysis of a land use change. If marginal and average costs are not similar and marginal costs are lower than average, as is experienced by many counties, then local governments face a problem commonly associated with large electric utilities or other *natural* monopolies: high initial fixed costs (e.g. infrastructure for water and sewer systems or schools) and lower operating or marginal costs. The result is that the additional cost of adding a user is small, while the average cost of servicing them is high. When a for-profit natural monopoly faces this cost situation, they often resort to average cost pricing, as marginal cost pricing yields economic losses for the firm. Although marginal cost may be the preferable information in many decision contexts, average cost provides valuable information to a county fiscal study, especially when the state of county finances, surplus or deficit, are the primary interest of the study.

Finally, in this study the unit of analysis is a "parcel" of land. Most of the county's costs depend on population levels and taxes are collected based on the population's ownership of parcels. As population increases, the number of parcels typically increases as parcels are subdivided and the configuration of parcels changes. Since we are interested in land use change due to population change, using the "parcel" as the basis of measure for costs and revenues is appropriate.

Pilot Site

Macon County was chosen as the pilot site in Kask (1996) because of its growth, its similarity to other counties in the region, and the availability of data. Continued population

growth³ in the county and changes in county services suggested an update of the 1996 study would be valuable.

Given that Macon County lies between Atlanta and Cherokee, NC (site of a growing gaming industry and gateway to the most visited national park in America), and a four-lane highway now exists between Macon County and Atlanta, the high rate of growth is expected to continue. Similar to other western counties, the mountain topography of Macon County increases the costs of providing services to residents. For example, the mountain terrain requires the county to maintain three bases for emergency medical services. The EMS bases are located across the county with one in the Northwest Nantahala region, one in the central Franklin area, and another in the Southeast Highlands district. Another similarity with other western counties is the large percentage of county lands owned by the State and/or Federal government. In Macon County, 46.2 percent of the land is owned by the U.S. Forest Service, which means that there are 258,000 acres on which no taxes are paid. The county does receive Payments In Lieu of Taxes (PILT) and a percentage of the timber sales, but this normally does not amount to more than one dollar per acre, an amount that is nowhere near what the county would receive if the land were taxed according to the current tax rate. Despite this tax status, the county still provides fire, police, and emergency medical services to these areas. Finally, Macon County is also similar to other counties in that it has a variety of income brackets with a median family income of \$30,900 in 1996, and a mix of land uses; however, rural and conservation lands predominate⁴. (North Carolina)

Macon County has computerized its data records and published much of it on line at www.dnet.net/macondb, making it more readily available for analysis. As more counties move in this direction, fiscal analysis using the hedonic method becomes more feasible. It is

<u>Variable Name</u>	<u>Description</u>
Acreage	Number of acres in a parcel
Age	Ages of structures on a parcel measured in years
Number of bedrooms	Number of bedrooms in a residential property
Barn/basement	Binary variable representing the presence of a barn or basement as indicated by a value of 1
Brick	Binary variable representing type of building material for parcel structure. Brick is indicated with a 1, all other materials are given a value of zero.
Land and Building value	Assessed value of properties in sample measured in 2000 dollars.
Location 2 (Holly Springs)	Binary variable representing property location in Holly Springs
Location 5 (Highlands)	Binary variable representing property location in Highlands
Location 8 (Cartoogechaye)	Binary variable representing property location in Cartoogechaye
Log	Binary variable identifying log built homes
No. of rooms	The number of rooms in primary property structure
Square feet	Square footage of property structure
Tax amount	Amount of tax paid in the previous year

Table 1: Variable Descriptions

important to note, however, that computerized data is not necessary for the implementation of the method presented in this report.

According to county officials, the additional cost of service from another residential or commercial customer is very small due to the high fixed (sunk) costs incurred by the county from serving a large group of part-time summer residents. County managers believe they are able to handle the current population growth when considering the major expenses of education and emergency services since they already have excess capacity due to the preparation levels required for the annual summer migration of 50,000 vacationers. The needed capacity already exists so the addition of new permanent residential or commercial parcels may have an insignificant additional cost at this point in time.

The Sample

Sample properties in three categories,

residential, commercial/industrial, and open space/farmland⁵, were selected randomly from identified areas in the county⁶. Identified areas include the high-income areas of Highlands and Franklin, lower income residential areas of the extreme Northwest and Southwest corners of the county, and the average middle income areas. Properties were chosen to equally represent the areas around the EMS districts, the fire districts, and the high schools. A final sample of 824 residential properties was selected from county property maps. Given that there is only one area in the county with easily identifiable commercial developments⁷, as many properties from this group were selected as possible. This gave a final sample of 40 commercial properties in the county. Although this is a small number of commercial properties, the county manager agreed that it was representative of the county since residential property continues to develop more rapidly than com-

mercial property. Finally, open space properties were selected for a variety of sizes (large and small tracts) and across locations in the county, with a sample of 728 finally selected. Table 1 provides a description of variables used in this study and descriptive statistics for each variable in each sample are given in Table 2.

Data on property characteristics and taxes paid in 2000 for each property were collected. In addition to capturing characteristics of each property, general location variables were used to capture neighborhood characteristics. Macon County has one school district. School Superintendent Lonnie Crawford stated that there might be dissimilarities in the structures of the different schools, but was quick to add that an identical high quality education is offered at every Macon County school. Emergency Service Administrator Warren Cade stated that EMS equipment and trained personnel were equivalent throughout the county. County manager Sam Greenwood felt that there was no

difference within the county in regards to the crime rate. The Sheriff's department, Franklin's police force, and the Highland's police department were considered indistinguishable when considering equipment, personnel, and response time. The three departments are believed to be more than enough to handle the low crime rate. According to county offices, the new \$3 million jail was recently built to replace the old one and not because of a growing crime rate. Although we don't expect differences in these areas as stated by the various county representatives, we continue to use location variables to capture other potential neighborhood variation.

Qualitative characteristics such as whether a home is brick, frame, or log, or where a property is located are represented with binary variables. These variables indicate whether a characteristic occurs for a chosen property and then compares the sample to a reference case. For this study, the reference case for residential properties is a frame home, without a barn or

<u>Variable Names</u>	<i>Residential</i> <i>N=824</i>			<i>Commercial</i> <i>N=40</i>			<i>Ag/Open Space</i> <i>N=728</i>		
	<u>Mean</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Min</u>	<u>Max</u>
Acreage	3.12	0.04	198.	9.23	0.23	105	4.22	>1	268
Age	20.27	>1	130	8.25	>1	44	ND	ND	ND
No. Bedrooms	2.58	1	6	ND	ND	ND	ND	ND	ND
Barn/Base	0.5	ND	ND	0.03	ND	ND	0.01	ND	ND
Brick*	0.06	ND	ND	ND	ND	ND	ND	ND	ND
Land and Building Value	108,971	4,230	1,310,170	124,042	100	1,436,330	35,732	100	838,800
Loc2* (Holly Springs)	0.13	ND	ND	0.03	ND	ND	0.23	ND	ND
Loc5* (Highlands)	0.04	ND	ND	ND	ND	ND	0.003	ND	ND
Loc8* (Cartoogechaye)	0.17	ND	ND	0.13	ND	ND	0.15	ND	ND
Log*	0.03	ND	ND	ND	ND	ND	ND	ND	ND
No. Rooms	5.31	1	12	1	1	6	ND	ND	ND
Square Feet	1,752	350	10,405	1,202	288	11,408	1.98	0	864
Tax Amount (\$)	552	55	5,376	367	0.47	1,691	150	0.45	3,659

ND = No Data for this variable

* These are binary variables and thus the values given represent the percent of the sample that has this characteristic. For example, 6% of the residential sample is brick homes.

Table 2: Sample Descriptive Statistics

	<i>Residential</i>		<i>Commercial</i>		<i>Ag/Open Space</i>	
	<u>Coefficient</u>	<u>t-stat</u>	<u>Coefficient</u>	<u>t-stat</u>	<u>Coefficient</u>	<u>t-stat</u>
Intercept	1982.47	0.43	-17049.83	-0.81	27099.49*	12.00
Loc2	15799.41*	4.09	122357.10	1.26	-9516.47*	-2.25
Loc8	7994.49*	2.33	65826.76	1.43	-164.48	-0.03
Loc 5					-83697.93*	-2.52
Brick	5400.84	0.97				
Log	19955.84*	2.55				
Barn/Base	20725.18*	7.76	42967.61	0.44	57960.48*	3.89
Square Feet	43.39*	20.94	23.87*	3.50		
Age	-360.91*	-4.74	3,083.16*	2.17		
Acreage	3732.30*	20.96	8,082.31*	10.67	2444.43*	24.86
# Bedrooms	2694.63	1.56				
Adjusted R ²	63%		83%		48%	
F-statistic	154		32		134	
Standard error of the estimate	36072		94739		46,696	
No. of observations	824		40		728	

* Significant at the 95 percent confidence level or higher

Table 3: Models used to Estimate Property Values

basement, located in area one (Franklin township⁸). The open space reference property is also located in area one.

III. PROPERTY VALUE MODELS

Three property value models were developed for a typical parcel of land in each land use category. In each case, the level of property value is the dependent variable with characteristics of the properties as the independent variables. The general form of the three models is

given in Equation 1 where vector Z represents the characteristics of a property.

$$\text{Property value} = f(z_1, z_2, \dots, z_n) \quad (1)$$

Property characteristics might include acreage, location, building characteristics, etc. Results for each model using data for each land use category are given in Table 3. More detailed location variables were not used due to the belief of county officials that Macon County services were provided equally across the

	<u>Residential</u>	<u>Commercial</u>	<u>Ag/Open Space¹</u>
Estimate	\$90,415	\$111,678	\$37,415
Lower Bound	\$18,270	\$0	\$0
Upper Bound	\$162,559	\$301,156	\$138,807

¹ The open space model for 1996 included both vacant lands and agricultural lands. In the 2000 data set all open space is classified as agricultural lands. The vacant land category no longer exists in the county data and county staff was unable to explain what happened to this category. However, review of the data suggests that these properties were incorporated into the three land use categories (residential, commercial and ag/open-space).

Table 4: Property Value Estimates with Confidence Bounds

county regardless of the specific area.

A goal of the analysis was to obtain a high degree of predictive power demonstrated by small confidence bands. Unfortunately, the large standard errors of the estimates decrease the predictive power of the models. However, the models are useful to indicate the trends occurring in Macon County and do provide estimates that illustrate issues county officials would be wise to consider.

In addition to predictive models, we were also interested in the impact of each property characteristic on the potential property value estimate. Therefore, a high level of explanatory power was also desired. The models do provide acceptable levels of overall explanatory power and confidence in the individual coefficients. Various model forms were tested to determine if a better fit of the data was possible⁹. In the end the linear form was selected as it provided the best fit to the data. The model results are given below in Table 3.

Using the results from Table 3, we estimate the property values from a typical reference parcel¹⁰ in each land use category. Using mean values for the continuous variables in Table 2 and the reference case, we can describe the typical reference parcel. The typical reference residential parcel is a 20-year-old frame home with 1,752 square feet, 3 bedrooms, without a barn or basement, on 3.12

acres located in Franklin township (Location 1). The estimated property value for this residential home is \$90,415. However, since this is an estimate and not the true value, we use the standard error of the estimate to determine the confidence bands in which the true property value will fall with a 95 percent confidence level giving a low property value estimate of \$18,271 and a high estimate of \$162,559.

Using the typical reference open space property with 4.22 acres, we find an average property value estimate of \$37,415, with a low of \$0¹¹ and a high estimate of \$130,807. For the typical reference commercial property with 1,202 square feet on 9.23 acres and that is 8.25 years old we estimate the average property value at \$111,678 with a low estimate of \$0¹² and a high of \$301,715.

Using the results above we can add or subtract from the estimated value in response to an alternative property characteristics. For example, for residential properties located in Location 2 (Holly Springs) we would add \$15,799.41 to the property value estimated getting \$106,214. A barn/basement adds another \$20,725 giving a property value of \$126,939. A barn added to open space property increases the value by \$57,960 to \$95,375. Moving the open space property to Location 2 decreases the property value by \$9,516 to \$85,859. A summary of the results is

	<i>Residential</i>		<i>Commercial</i>		<i>Ag/Open Space</i>	
	<u>Estimate</u>	<u>Sample*</u>	<u>Estimate</u>	<u>Sample*</u>	<u>Estimate</u>	<u>Sample*</u>
Estimated Property Value	\$90,414.77	\$108,971.00	\$111,677.70	\$124,042	\$37,414.98	\$35,732.00
Ave. Property value / 100	\$904.15	\$1,089.71	\$1,116.78	\$1,240.42	\$374.15	\$357.32
Property tax rate	\$0.43/ \$100	\$0.43/ \$100	\$0.43/ \$100	\$0.43/ \$100	\$0.43/ \$100	\$0.43/ \$100
Average Property tax	\$388.78	\$468.57	\$480.21	\$533.38	\$160.88	\$154.00
Low Property tax	\$78.56	\$18.18	\$0	\$0	\$0	\$0
High Property tax	\$699.00	\$5,634.00	\$1,294.96	\$6,176.00	\$562.47	\$3,606.00

* Sample values are given for the mean property value and for the minimum and maximum property values in the sample.

Table 5: Calculating Property Tax

	<u>Residential</u>	<u>Commercial</u>	<u>Ag/Open Space</u>
Education	✓		
Government Administration	✓	✓	
Public Safety	✓	✓	✓
Public Services	✓	✓	✓
Social Services	✓		
Health Services	✓		
Recreational and Cultural	✓		
Economic Development		✓	

Table 6: Allocation of Services across Land Uses

given in Table 4.

Using the property value estimates we calculate three revenue cost ratios for each land use category. The tax revenue estimate for any property can be estimated simply by multiplying the estimated property value by the given tax rate.

Table 5 demonstrates how the tax revenue is calculated for the cost to revenue comparison. The property tax in fiscal year 2000 was \$0.43 per \$100 of value. The estimated value of the property is divided by 100 and then multiplied by 0.43. Note there are zero values in two categories for the low tax estimate. The tax amounts reported in the descriptive statistics show zero taxes paid by some open space properties and some commercial properties. This can be for either of two reasons: they may be a road side easements which have negligible taxes or for which the tax payer may have paid taxes in advance and thus not paid this year, or there may be a tax deferment. In the former case, the result occurs because of a low property value; in the latter two cases it occurs due to tax policy. In this study the zero tax assessment is a result of lower bound property value estimate. This occurs because of the small sample size and large standard error of the estimate for this model.

How do different types of residential development affect the property value? For example, do we want to encourage development with large tracts and few small houses, or smaller tracts with larger houses? The results

from Kask (1996) suggested that clustered¹³ housing was more likely to generate higher tax revenues than sprawl housing. In the new sample of data we see that the impact of an additional bedroom on property value is \$2,695, where as an additional acre adds only \$3,732 to the property value. This suggests that an additional acre adds \$1037.00 more to the tax base than does a bedroom. However, when we translate this into tax revenues we have only a \$45.00 difference in tax collected from an additional bedroom versus and additional acre. At this time, it appears that cluster housing and sprawl housing have similar impacts on revenues collected. However, given that often the cost of services to sprawl¹⁴ development is often greater than the cost of services to clustered housing, it then still remains that from a fiscal standpoint, clustered housing likely remains a better option for Macon County. The county may want to encourage cluster housing that often imposes lower costs for county services. However, if the demand for sprawl development is greater relative to cluster development, higher property values for the latter may result, yielding higher tax revenues. This study does not capture this effect.

IV. COST OF SERVICES

In order to determine the impact of alternative land uses on the county's fiscal status it is important to account for all revenues the

county receives and to allocate those revenues to the various programs. However, the county receives revenues from a variety of sources. Consequently, not all services provided by the county are supported by property tax. Some services are fee-based and others are supported by special grants and state allocations. In order to avoid subsidizing tax-supported services with fee-based and/or grant-supported services, it is important to remove these latter services from our analysis. Therefore, as mentioned above, this report compares the property tax receipts with the property tax-supported services in order to determine the fiscal impact of land use changes instead of including the entire budget.

By following the example set in similar studies by the American Farmland Trust, this report distributes the expenditures of the local government into simple yet usable categories. The county expenses have been divided into eight crucial groups: *Education, Government Administration, Public Safety, Public Services, Social Services, Health Services, Recreation and Cultural, and Economic Development*. Each group is divided accordingly among the three land uses as shown below in Table 6.

Ag/Open Space is only responsible for two types of expenses. Public safety is required in the form of police and fire protection and public services are necessary in the form of agricultural extension services. Commercial properties also create public safety and public services expenses as well as being responsible

for some of the general administration expenses and all of the economic development costs. Residential properties are allocated the education, health services, recreational and cultural, and social services as well as the remaining portions of the public safety, public services, and general administration expenses.

Fee-based costs covered directly from the users of a service are subtracted from these categories ensuring that only the property tax-supported portion of service budgets are allocated across the three land uses. Costs that could not be allocated to a particular land use or cost category were appropriated to all the groups based on their proportion of parcels relative to all parcels within the county. When a cost is allocated across only residential and commercial properties, it is allocated based on the proportion relative to the total number of parcels in the two categories. The proportional relationship of land uses within Macon County is displayed below in Table 7.

Table 8 presents the final allocation of the County's cost of services for each land use. Note that commercial properties have the lowest cost allocation. This result occurs due to the low proportion of commercial properties in the county and the limited services provided to these properties. This trend is expected to continue since residential growth is continuing at a faster pace than commercial development. One possible explanation for this is the growing number of vacation and retirement homes. The values in Table 8 were used to calculate the revenue-cost ratios presented in the next section.

	<u>Residential</u>	<u>Commercial</u>	<u>Ag/Open Space</u>
Number of Parcels	22,000	1,350	16,543
Percentage of total parcels	55%	3%	42%
Percentage of residential plus commercial	94%	6%	

Table 7: Proportions used for Cost Allocations

V. FISCAL IMPACT ANALYSIS

Using the three per parcel revenue values estimated for each land use in Section 3 and the cost allocation in Section 4, we can derive revenue cost ratios that show the dollars received in tax revenues per dollar of tax supported costs expended for the average parcel for each group. Table 9 presents these results.

The results in Table 9 show that in the case of the *typical* reference residential and commercial properties, the county is receiving less in revenues than they are incurring in costs. Assuming alternative property characteristics such as a barn or basement, or another location, still leads to the same result¹⁵, with revenues closer to costs. These results suggest the county would not want to receive tax payments of less than the average cost of services per residential parcel, which is \$676.11, nor receive less than \$1026.16 for average commercial properties, nor less than \$141.24 on average per open space parcel. However, using this study's data we find that 90 percent of commercial properties and 76 percent of both the residential and open space properties pay tax

amounts less than the average per parcel cost of services in each category, respectively. The above suggestion is a form of average cost pricing for local government and is based upon a "user pays" principle, which may or may not be appropriate for communities when allocating cost of services.

Finally, despite documented results that vacation and retirement homes are usually "tax positive" (e.g. Brighton, 1997 and Chazal, 1995), Macon County officials felt that this was not representative of their county. While the vacation homes require only a seasonal demand of services, the increase in population from a normal 30,000 to an estimated 80,000 during the peak vacation months more than negates the money surplus seen due to low demand during the rest of the year. Since two-thirds of the year's work occurs during the summer, county officials felt that preparation for the tourist season, the necessary extra man-hours, and the capital needed to provide for such a large increase in population cost the county too much to allow them to recognize vacation homes as "tax positive." Considering the large number of retirement homes in Macon County, the increase in demand for police and emergency

	<u>Total</u>	<u>Residential</u>	<u>Commercial</u>	<u>Ag/Open Space</u>
Education*	\$292,800	\$292,800		
Government Administration	\$6,252,983	\$5,877,804	\$375,178	
Public Safety	\$2,958,711	\$1,627,291	\$88,761	\$1,213,072
Public Service	\$2,740,212	\$1,507,117	\$82,206	\$1,123,487
Social Services	\$2,076,050	\$2,076,050		
Health Services	\$2,553,999	\$2,553,999		
Recreation	\$939,329	\$939,329		
Economic Development	\$839,165		\$839,165	
Total (\$)	\$18,653,249	\$14,874,390	\$1,385,310	\$2,336,559
Total (%)		79.74%	7.43%	12.53%

* Public education in North Carolina is supported primarily with state allocations from income and other taxes. Local government pays for buildings and can supplement teacher salaries with sales taxes. This figure includes only the contribution from property taxes for this fiscal year.

Table 8: Total Cost Allocations for Macon County by Land Use Categories

	<u>Residential</u>	<u>Commercial</u>	<u>Ag/Open Space</u>
Per Parcel Cost Allocation	676.11	1026.16	141.24
Tax Estimate	388.78	480.21	160.88
Lower Bound	78.56	0	0
Upper Bound	699.00	1294.96	562.47
Rev/Cost Ratio-Average Tax Estimate	0.58	0.47	1.14
Ratio-Lower Bound	0.12	0	0
Ratio-Upper Bound	1.03	1.26	3.98

Table 9: Fiscal Impact of Alternative Land Uses

medical services for the elderly nullifies the savings recognized from education services, according to county officials.

VI. SCENARIO ANALYSIS

A scenario analysis of a 30 acre parcel that could either remain in Ag/Open space, or be converted to ten three-acre residential lots shows that the county would lose \$532.00 from county coffers on the residential conversion, but would gain \$290.00 into county coffers if the land remains in ag/open space use. Although this is a stylized example, it illustrates the application of the models and the potential cost of development to the county in services needed by the population residing in developed areas. Larger homes generating higher property values would likely generate sufficient revenues to cover costs of county tax-supported services.

VII. POLICY IMPLICATIONS

As the study shows, based on the current tax rate of 43 cents per \$100 of property value, the county is currently spending more than it is taking in *on average* for residential and commercial properties and is just covering costs on open space. The large confidence bands reported in this study show that at the upper-bound estimates all land uses are covering costs. However, as reported earlier, only 10 percent of commercial properties and 24

percent of residential and open space actually pay tax amounts greater than the average costs for their respective categories. Thus the upper-bound estimates may not be adequate indicators of current conditions in the county. The results of this study concur with previous studies debunking the myth that increases in land development will improve a community's fiscal integrity by increasing the tax base. Although increasing the tax base may improve a community's fiscal position, there is no guarantee that this will occur.

Our result is more important when we consider the many other costs incurred by the county from land development that are not considered in the budgeting process. These other costs include the negative impacts of land use changes on the county's rural character and decreased water quality from increasing population and land development. This study does not include these costs in the cost estimates.

While modest expenditures for soil conservation are included in the county's budget, these do not account for all the costs of conserving water quality. As the number of commercial and residential properties continues to increase, the number of construction and grading sites, pavement, manicured lawns, as well as the need for increased sewage treatment all increase. The impact from these increased activities is a reduction in water quality from erosion and effluent in the form of the runoff of petroleum products and fertilizers, problem


septic systems, etc. These costs are not addressed in the county budgeting process and are also not paid by those who impose these costs on the community. Furthermore, if sprawl development predominates in the county, increased costs of water and sewage infrastructure will occur from the increased development. These costs are also not accounted for in the budgeting, or decision processes, for land use in the county.

The role of tourism in the economy is another important factor to consider when considering land use changes in Macon County. During the summer, vacationing families more than double the county's population. Tourists flock to Macon County every year because of its rural, rustic charm. If development continues to consume the Ag/Open space parcels, especially along the major roadways (Wear and Bolstad, 1998), then the tourism market may suffer. Once the beautiful mountain scenery has been altered through development, it may take many years to return to its original beauty. Therefore it is important for a community to decide if its rural charm is important enough to influence land use changes.

VIII. CONCLUSIONS

Macon County is in an enviable position in that it currently has significant amounts of open space. Thus the county is ahead in the planning process and is positioned to make proactive decisions about growth in its community as compared to many other communities that are reacting to their diminished quality of life. Although Macon County is ahead of the game, it must take stock of its current position to be sure to avoid problems found in other regions of the U.S. This fiscal impact study can provide information for the decision processes facing the county.

According to Macon County officials, county employees will handle the next property appraisal. In the past, the county has contracted an outside firm to handle property

appraisals. Macon County can use this report with its property appraisals to evaluate the impact of significant land use changes on the county budget. The county officials responsible for the next assessment will be aware of the costs associated with land use changes and will be able to design appropriate planning and tax strategies. For example, county officials could consider different tax rates for different land uses. One option might include the assignment of a lower tax rate to open space; since open space has lower overall costs, this policy would provide a benefit to those owners in return for the savings they provide the county. This study may provide a catalyst for developing creative ideas of how to better allocate the cost sharing of county services across land uses, as well as account for the intrinsic benefits received from the land uses. 

Endnotes

- ¹ Municipal Approach analyzes total expenditures and tax revenues by category of land use. The Single property Approach analyzes a particular property. (See Miller 1992)
- ² Sales taxes are earmarked for specific services.
- ³ According to the North Carolina Department of Commerce, Macon County is the fastest growing County in western North Carolina, with a population growth rate of 15.1% between 1990 and 1996
- ⁴ See the 1992 Macon County Land Use Plan for more detail on land uses in Macon County. Rural land uses include agriculture, forestry, and mineral extraction. These lands are also considered low density and relatively undeveloped. The conservation category includes lands such as ridge tops, areas with excessive slope, flood plains, wetlands, and areas with high potential for wildlife.
- ⁵ Open Space was defined as undeveloped or agricultural properties with no more than a shed barn present on the property.
- ⁶ Although a time-series cross-sectional data set may provide better property values estimate this

could not be done because Macon County does not keep past property values on record.

⁷ Most of the commercial development in the County is in the Franklin city limits. This study looks specifically at county services and taxes and thus no observations from the city were considered.

⁸ Although a property is in the Franklin Township it is not necessarily in the City of Franklin. None of our properties are located in the city, although many are in the township.

⁹ Double log, log linear and quadratic forms were tested; however, the linear form provided the best fit to the data.

¹⁰ A typical reference parcel is defined as one with mean values for each of the continuous variable characteristics and with zero values for each of the binary variables (0 or 1 values).

¹¹ A zero property value is somewhat feasible since roadside easements are part of this data set and they have very low values, with the lowest in the sample at \$100.

¹² In this case a zero appears less feasible, however, the commercial data set also includes a minimum property value of \$100 in the sample.

¹³ Clustered housing occurs when homes are clustered together on smaller lots and may or may not be surrounded by undeveloped property.

¹⁴ A sprawl development is one where homes are spread out on larger lots, or are separated by undeveloped properties.

¹⁵ A barn or basement adds \$89.00 to tax revenues and Location 2 (Holly Springs) adds \$68.00 to revenues, increasing tax revenues by \$157.00.

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