Fiscal Impact Analysis:
Methods, Cases, and Intellectual Debate

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Introduction

Property investments—whether a new mall, industrial plant, or residential development—inevitably have planning and economic consequences for the local community. Fiscal impact analysis, a tool introduced in the 1970s, seeks to connect planning and local economics by estimating the public costs and revenues that result from property investments. The fiscal impact of development is the effect of new investment, new construction, new employment, new population, new school enrollment and other changes on a government's budget. When new businesses start, new houses are built, and new people move into a community, local governments receive additional revenue. The business owners and homeowners pay new property taxes. New residents pay new local income taxes and motor vehicle taxes. New people and businesses pay more charges, fines and fees. However, these new people and businesses also create new costs. New businesses and housing developments may require new roads, sewers, police and fire protection. New residents may demand new parks. Greater traffic congestion may require more roads, traffic lights and police patrols. More children in schools may require more teachers and even new school buildings. Thus fiscal impact analysis enables the comparison of new revenues to new costs. If new revenues exceed new costs, the fiscal impact is said to be positive. The local government can more than meet new demands for services, and (perhaps) provide a tax reduction for existing taxpayers. If new revenues fall short of new costs, however, the fiscal impact is negative. The local government must raise taxes to meet new service demands, and (perhaps) reduce the quantity or quality of existing services.

Fiscal impact analysis can be used on two levels:

- *At the macro level,* to analyze growth as it affects an entire jurisdiction, such as a county or city. This jurisdiction-wide model allows examination of alternative development scenarios by focusing upon land use patterns, growth rates, service costs, and capital facility spending.
- *At the micro level*, to determine the effects of specific projects on the overall community. For example, a community can analyze the pricing and absorption rates of a project to determine its marginal costs before granting a building permit, variance, or zoning change.

Benefits

The benefits of fiscal impact analysis are impressive. At the most basic level, these analyses bring a realistic sense of the costs of growth into the planning discussion. Indeed, they can provide an objective screen so that all parties in the development process have a clearer understanding of the likely results. Moreover, the analysis helps decision-makers link planning to the local annual budget. For example, community leaders would know if the completed project would make more tax money available for municipal needs or if the town could cut property taxes.

In an abstract sense, fiscal impact analysis tends to remove myths and helps to minimize the emotionalism that can accompany public debate. On one side, an analysis may show that not all growth in the community is positive at its present rate. On the other, it may show that a project such as market-rate housing would not overburden existing schools.

Fiscal impact analysis thus provides a knowing public the information required to make a fair decision. Through the data collected as part of a fiscal impact analysis, the community is better prepared to examine its long-term needs. The results help immensely in creating a capital improvements plan and making a community's ability to pay transparent. Moreover, the knowledge created through fiscal impact analysis is fundamental for preparing a bond rating and submission package.

Finally, fiscal impact analysis helps communities better understand their values. For example, a small rural community might want to reduce the property tax burden by rezoning some property to allow highway business. After looking at the construction and land costs, however, the community realized that such a development would overwhelm its rural character and decided to 'embrace the inconvenience' of a heavy residential tax base.

Limitations

At the same time, several factors limit the application of fiscal impact analysis, including:

1. Need for some training to apply a particular technique and interpret the results. Many smaller communities, most often without professional planning expertise, do not have citizen planners who have this experience.
2. Useful only when there are clear cost implications for the municipality. Typically, the cost of a newly constructed small store along Main Street or a new single-family home, by themselves, will have minimal fiscal impacts on the community.
3. Presence of political factors. For example, when promoting a Wal-Mart in his/her home town, a mayor will argue that retail prices will be lower, shopping more convenient, jobs will be added to the employment base, and tax revenues will increase. Against this backdrop, it is often difficult to convince a political leader that Wal-Mart pay rates may not provide a living wage, that the downtown might loose businesses, that new investments in a police cruiser may be required, and that, at the end of the day, the new store may be a tax liability.
4. Lack of consideration for social and environmental factors. Some analysts argue that one should not simply look just at the fiscal implications of development, but also impacts associated with environment, traffic, and community character. These assessments can be costly and time-consuming.

To address these limitations, several researchers prefer to look at environmental impact statements, cost of services studies and more integrated econometric models. Alternative to fiscal impact analyses will be discussed later in this report.

Methods for Estimating Fiscal Impacts

Since Listokin and Burchell's (1978) seminal volume outlining 6 methods for fiscal impact analysis, these models have been applied and refined and will be outlined, with critiques of the benefits and limitations of each model below. (Burchell et. al, 1994; Burchell et.al,1985). To begin however, it is necessary to provide a general understanding of how to measure the revenues a development project generates against the costs the community incurs in servicing the project.

A community has three basic revenue sources—property taxes, state aid, and miscellaneous taxes and fees such as those paid for town government services. With the recent cutbacks in state aid, property tax revenues now account for the large majority of municipal revenues. On the cost side, the three basic categories are schools, services (such as road maintenance, government, police, fire protection, sewer, water, recreation, waste removal), and debt service.

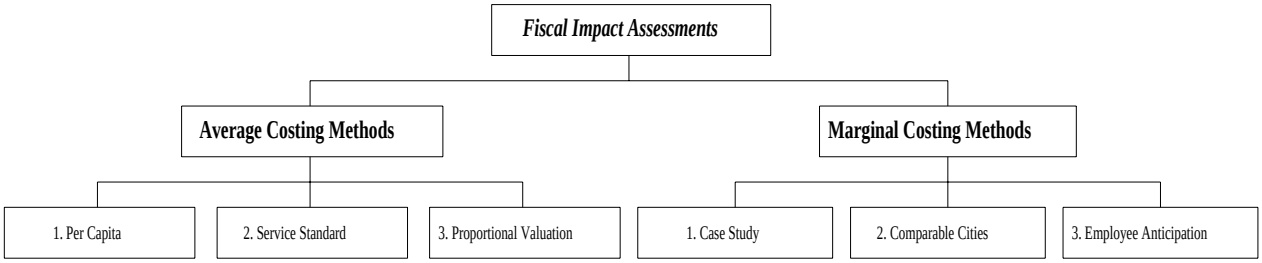
Calculating Revenues
Revenues to be considered are (a) property taxes generated by the new development, (b) miscellaneous revenues based on current patterns and proportions, and (c) state aid (mainly for education), also based on current patterns and proportions.

The following example illustrated the revenue calculations for one single family home in a typical suburban community.

REVENUE FROM NEW RESIDENTIAL DEVELOPMENT	
Revenue from Property Tax on Development	
Market Value of Development	$350,000.00
multiplied by	
Assessment Ratio	100.00%
Actual Assessed Value	$350,000.00
multiplied by	
Residential Tax Rate /$1,000	$16.01
Estimated Property Tax Revenue	**$5,603.50**
Miscellaneous Revenue	
Miscellaneous Revenue	$10,609,073.00
multiplied by	
Residential Proportion of All Property	75.00%
Miscellaneous Revenue from Residential Use	$7,956,804.75
divided by	
Number of Residential Units	7,610
Miscellaneous Revenue per Housing Unit	$1,045.57
Number of New Homes	1.00
Estimated Additional Miscellaneous Revenue	**$1,045.57**
Additional State School Aid	
State School Aid	$12,430,645.00
divided by	
Number of School Children	4,904.00
School Aid per Student	$2,534.80

multiplied by	
Number of Students in New Development	0.89
Estimated Additional School Aid	**$2,255.97**
Total Estimated Revenue	**$8,905.04**

Calculating Costs
The two cost estimation approaches that practitioners most often use in fiscal impact analysis are average costing and marginal costing. Each of these approaches includes three specific estimation techniques.



Average Costing Methods
Average cost is most often used in fiscal impact analysis because it is easy to apply and appears more equitable to public officials and citizens. Costs assigned to new development are based on the average cost of providing the service per unit (i.e., per household, student, or employee) times the number of new service units. This method works best when the project represents an incremental demand for services within the current capacity of local infrastructure. The three techniques that fall within this method are:

1. Per capita multiplier technique. The most common cost estimation technique, the per capita multiplier was first used in the 1950s to determine whether certain types of development "pay their own way." It was also the first large-scale statistical study to predict public expenditures (Mace 1961). Early analyses used per pupil multipliers to estimate education costs. In the 1960s and 1970s, the technique evolved to include demographic profiles of residents and children associated with different housing types, linking this information with average municipal operating costs per person and school district operating costs per pupil to estimate the local costs of population change.

The per capita technique is applied on a jurisdiction-by-jurisdiction basis for all of an area's major service providers, including municipalities, school districts, and county government. Growth-induced public service costs are determined by multiplying the per capita cost by the total number of people, employees, and pupils introduced by development.

Assumptions

- Over the long run, current average operating costs per capita and per student are the best estimates of future operating costs occasioned by growth.
- Current local service levels are the most accurate indicators of future service levels, which will continue on the same scale.

- The current composition of the population contributes to costs, and the future population will contribute to costs in a similar manner.
- The distribution of expenditures among the various municipal services will remain constant in the short run and serve as a guide to allocation of future expenditures.

Outputs of Analysis

- Current public service costs on a per unit basis (per pupil for the school district, and per capita/per employee for the municipality).

Applicability

- Ideal for evaluating fiscal impacts of residential development proposals, land use alternatives within a proposed growth strategy, and annexation or rezoning proposals, as well as fiscal segments of suburban environmental impact statements (Burchell and Listokin 1978).
- Appropriate for communities where future demand for services is on par with the scale and scope of existing services.

Benefits

- Straightforward, relatively easy to accomplish, and usually provides a quick understanding of development impacts.
- Data are easy to gather.
- Most widely accepted fiscal impact method available, particularly for private planning consultants.

Limitations

- Lack of richness of detail, with estimates only to the level of municipal and school district services.
- May be the least accurate cost estimation method, given that it does not account for the current service capacity, which new development may maximize (decreasing per capita costs) or exceed (increasing per capita costs), or the possibility that a new development might call for major new capital construction.
- Results may be inaccurate if based on outdated decennial census information. (The later in the decade that this information is used, the less accurate it will be.)

Example

Of the three types of costs associated with residential development, the most significant is for schools. These costs are calculated by applying the current cost per student to the estimated number of new students. The second cost element relates to service costs, which is calculated based on existing service costs applied in a proportionate manner to new development. The third cost element comes into effect if development triggers some sort of capital expenditure. Again, the capital costs are applied in a proportional manner.

COSTS DUE TO NEW RESIDENTIAL DEVELOPMENT	
School Costs Due to Development	
Current School Cost per Student	$6,039.04
Number of Students in New Development	0.89
Total School Cost per Year	**$5,374.75**
Service Costs Due to Development (Library, health, recreation, etc.)	
Town Expenditures Excluding Schools	$28,921,822.00
multiplied by	
Residential Portion of All Property	75.00%
Service Costs Due to Residential Development	$21,691,366.50
divided by	
Number of Residential Units	7,610.00
Service Cost per Unit	$2,850.38
Number of Homes in New Development	1.00
Town Service Costs for Residential Units	**$2,850.38**
Total Costs Due to Development	**$8,225.13**

2. Service standard technique. The service standard technique uses averages of manpower and capital facility service levels, obtained from the US Census of Governments, for municipalities and school districts of similar size and geographic location. The analyst determines the local operating cost for additional personnel that contribute to local operating outlays (salary, plus statutory and equipment expenditures) per employee by service function (e.g., $14,500 per policeman), and to an annual expenditure for capital facilities specific to the service function. The annual capital expenditure is obtained through capital-to-operating service ratios derived from census information, and applied to the total local operating cost per employee.

The service standard technique has been used since 1940s, but is not as prevalent as per capita and case study techniques because it is not easy to obtain and apply national standards to local municipal and school district expenditures. This approach uses mean employment levels and median capital–to-operating ratios obtained at a regional level.

Assumptions

- Current average service levels for both manpower and capital facilities of comparable cities can be used to assign costs to future development.
- Service levels for both manpower and capital facilities vary according to population.
- Geographic location affects public service levels.
- Average servicing levels for the current population can be used for the new development.

Outputs of Analysis

- Total number of additional employees by service function (financial administration, general control, police, fire, highways, sewerage, sanitation, water supply, parks and recreation, and libraries) required as a result of growth.

Applicability

- Most useful in communities where current service capacity is closely aligned with service demand, without considerable excess or deficiency.
- Most suited for mid-size, moderately growing suburban areas or slower-growing cities. More information about these areas is available than for rapidly growing or declining ones, making mean employment levels and median capital-to-operating ratios more reliable.
- Useful for general fiscal planning and for projecting impacts of annexation, given that public personnel costs make up the largest share of costs in these cases.

Benefits

- The only technique, other than case studies, to provide information on personnel requirements.
- Not only predicts the financial consequences of population change, but also traces specific changes needed for each public service category.
- Results are easy to understand and widely accepted.
- Relatively simple and low cost to implement, requiring no knowledge of internal municipal operations.

Limitations

- Assumes that current local performance is similar to current expenditure patterns in cities of similar size and location. Differences in actual performance (e.g., in terms of wealth, labor rules or public services) may result in under- or overestimates of costs.

Example
Calculate service standards for a community in the Northeast with a population of 22,166

	Multiplier Per 1,000 Population	Estimated Employees
General Government		
Financial Services	0.45	10
General Control	0.61	14
Public Safety		
Police	2.08	46
Fire	0.99	22
Public Works		
Highways	1.15	25
Sewer	0.32	7
Sanitation	0.59	13
Water Supply	0.4	9
Recreation and Culture		
Parks and Recreation	0.34	8
Libraries	0.26	6
School District Functions		
Primary and Secondary Schools	85	85

3. Proportional valuation technique. The proportional valuation technique is perhaps most used to estimate the impacts of nonresidential development. The technique assigns costs attributable to the share of the real property value that a nonresidential use adds to a community's property tax base. The proportional valuations approach was first used in the early 1950s to assess whether nonresidential development as a land use had local fiscal benefits, and later to analyze the impact of specific classes of industrial and commercial development.

Assumptions

- Municipal costs increase with the intensity of land use.
- Change in real property values is a substitute for change in land use intensity.
- Aggregate impacts of commercial and industrial land uses on municipal services are similar enough to be grouped into a single nonresidential use category.

Outputs of Analysis

- Fiscal impact of nonresidential projects that fit current development patterns in the community (i.e., that do not trigger excessive demands on municipal services).

Applicability

- Best used as a quick, straightforward technique when the proposed nonresidential development requires neither very high nor very low employment levels.
- Valid when a reasonable estimate is sufficient and/or when time and financial resources are limited.

Benefits

- May be completed quickly and inexpensively.
- Data required are inexpensive and readily available.
- Acceptable for assessing impacts of nonresidential facilities.

Limitations

The proportional valuation method includes some underlying assumptions which may be overly simplistic including:

- Costs increase with the intensity of land or as land is more developed. This may or may not be the case
- Groups industrial and commercial development into to one land use category, thus assuming that impacts on these two different types of land use are similar..

Example

Project the proportion of incoming facility to total local nonresidential property value and multiply it by total existing municipal expenditures attributed to existing nonresidential uses to determine additional expenditures due to new development.

Proportional Cost from New Development	
Total Municipal Expenditures	$3,726,407.00
multiplied by	
Proportion of Nonresidential Value	17.35%
equals	
Total Expenditures Attributed to Nonresidential Uses	$646,531.61
Value of New Development	$90,000,000.00
divided by	
Value of Existing Nonresidential Development	$82,427,260.00
equals	
Proportional Increase in Nonresidential Value	109%
Total Expenditures Attributed to Nonresidential Uses	$646,531.61
multiplied by	
Proportional Increase in Nonresidential Value	109%
equals	
Costs Allocated to New Facility	**$705,929.63**

Marginal Costing Methods
Marginal costing methods differ from average costing methods because analysts or local officials use subjective judgment (and possibly local economic indicators) to adjust the estimates to reflect specific changes expected from the new development. The marginal approach generally uses prototypes or case studies as guides to estimate future cost and revenue impacts for similar types of development in a community.

In principle, the marginal costs and revenues of a change in the structure of a regional economy are the relevant measures for decision-making. In practice, however, obtaining these measures for a specific change, such as a land use decision, is problematic and relies on careful analysis of the existing supply of and demand for services. In short, while more realistic, this type of analysis is also more difficult to undertake. As with average costing, three techniques fall under the category of marginal costing.

1. Case study technique. The case study technique is the classic marginal cost approach to projecting the effects of population on municipal and school district costs. The technique was first used in 1930s as a tool for cost-revenue assessments in declining areas. It was then used for public housing fiscal impact studies in the 1940s, for HUD-assisted master planning and community capital facility planning in the 1960s, and growth/no-growth alternatives from the 1970s to the present. Case studies rely on interviews with public officials to assess plans to expand or maintain local services, and then determine categories of either excess or deficient service capacity.

Assumptions

- Communities differ in the degree to which they exhibit excess or deficient service capacity.
- Local service levels—rather than national standards—are the criteria against which to calculate excess and deficient capacity.
- Local department heads are most familiar with service delivery issues and, when properly approached, will provide the most accurate information about future expenditures.

Output of Analysis
Fiscal impacts of both residential and nonresidential development with detailed estimates based on a particular project.

Applicability

- Best used when either excess or deficient service capacity is suspected. For example, a city in decline that is deciding on a public housing project may have excess water supply. The case study can take into account these “elastic conditions,” which make costly investments unnecessary in the short term. In situations where resources are already strained, the case study can paint a vivid picture of the immediate impacts of increased development.
- Most applicable for administrators, such as the head of a water and sewer department, looking for immediate insights into potential impacts (e.g., how much equipment or manpower a specific project might require).

Benefits

- Offers specific and unique insights into the immediate and long-term impacts that other methods may not provide. For example, case

studies can detail manpower and capital facility needs as a prerequisite for assigning costs.
- More sensitive than other techniques to absorption capacity of existing services.
- Generally well accepted since findings are presented in terms that people can understand.

Limitations

- Costly and time-consuming to implement because of the detail involved.
- Accuracy depends on the ability of local officials to predict the consequences of growth in a specific area.
- Requires the cooperation of and direct knowledge of public officials.
- Requires sophisticated analysts/interviewers to discern respondents' biases.

Example

Each major department is asked to anticipate additional capital and operating costs for a new residential development.

Total Costs due to Capital Improvements	
Public Works	$200,000.00
Police and Fire	$50,000.00
Number of Years that Costs will be Spread Over	
Public Works	5
Police and Fire	2
Finance Rate per Year	
Public Works	6%
Police and Fire	6%
Debt Service per Year (principal + interest)	
Public Works	$47,479.28
Police and Fire	$27,271.84
Percentage Attributed to New Development	
Public Works	10%
Police and Fire	10%
Capital Improvement Costs Due to Development	**$7,475.11**
Additional Annual Operating Costs	**$100,000.00**
Percentage Attributed to New Development	**100.00%**
Additional Annual Costs Associated with Development	**$100,000.00**
Total Estimated Costs	**$107,475.11**

2. Comparable city technique. While similar to a case study, the comparable city technique is useful when administrators have no precedent for the type or scale of development on which to predict costs. This approach looks at similar projects in similar communities and anticipates cost impacts based on comparables. First used in the 1970s, the comparable city technique represents a proportional relationship of average expenditures of cities of various sizes and growth rates. The averaging comes from the creation of multipliers calculated from the U.S. Census of Governments. The multipliers are based on growth rates and community size. The method estimates increases or decreases in future gross expenditures for the five basic municipal services (general government, public safety, public works, health and welfare, recreation and culture)

Assumptions

- Municipalities of similar size and with similar growth rates will have similar changes in their municipal costs by category.
  - The city's growth rate affects local service expenditures.
  - Current expenditure patterns of the municipality or school district are a key indicator of future expenditures.

Outputs of Analysis

- Effects of population change on municipal and school district costs and revenues.

Applicability

- Intended for communities where population gains or increases in growth rate are likely because of large-scale development or school/municipal redistricting.
- Often applied when analysts believe that the experience of other communities undergoing population change supports or corroborates the anticipated changes in the community under study.
- Also useful for communities experiencing decline because the multipliers take population decreases as well as increases into account.
- Not appropriate for local budget planning because it does not consider specific personnel requirements.

Benefits

- Given availability of required data, can be undertaken quickly and inexpensively.

Limitations

- Validity of expenditure multipliers is questionable because this technique assumes local and capital expenditures related to growth are similar for cities of comparable size and growth rate. These average expenditures may not, however, exactly match those of the community under study. For example, a community that is more concerned about crime will spend more on policing than one that is less concerned.
- If conducted at the state level (e.g., for housing), the analysis involves some degree of grouping of jurisdictions or "binning." Binning occurs when the "bins" are so large that they obscure relevant data. Regardless, the process of categorization means that some data may be lost.

- Each municipality has its own priorities, population mixes, government structures, and taxpayer priorities, reflecting variations in the needs, wishes, and spending. Any comparison that tries to fit various municipalities into simple categories misses these variations.

Example
If community A were to build a 15,000 square foot mall with a fiscal cost benefit ratio of 1:3, a comparable community B, development characteristics being equal, could assume the same benefits.

3. Employee anticipation technique. This technique, based on the anticipated needs for new workers, was developed at the Institute of Urban Studies in Charlotte, North Carolina in 1976 and then refined by the Center for Urban Policy Research at Rutgers University. The employee anticipation technique predicts changes in municipal costs based on the expected change in local commercial/industrial employment.

Assumptions

- Local commercial or industrial employment levels affect the magnitude of local municipal expenditures.
- Impacts of additional employment will vary for communities of different population sizes and growth rates.

Outputs of Analysis

- Impacts of nonresidential growth on local municipal costs and revenues.

Applicability

- Useful for identifying the impact of nonresidential development on municipal costs.
- Ideal for fast approximations, making it a good tool for evaluating alternative nonresidential land uses.
- Should be used instead of the proportional technique if the employment situation may be unique (e.g., a large industrial use such as power station, which would have relatively few employees).

Benefits

- Expresses future municipal costs as a function of expected employees of a nonresidential facility.
- Provides greater detail costs than the proportional valuation technique.
- Quick and inexpensive to implement.

Limitations

- Relies on coefficients to express change in per capita municipal expenditures for categories of cities defined by population size. Uses a single multiplier for categories of cities defined by population size.
- Does not provide coefficients for cities with populations over 150,000.

Example

The employee anticipation technique applies coefficients that show the percentage increase in public costs attributable to commercial or industrial employment changes. In this example, the analysis is based on the addition of 3,000 new employees.

	CATEGORIES							Total
	Government	**Public Safety**	**Public Works**	**Health & Welfare**	**Recreation**	**Other**	**Debt Service**	
Annual Municipal Expenditures	$838,829.00	$1,268,155.00	$601,093.00	$42,108.00	$121,938.00	$831,866.00	$1,437,849.00	
divided by								
Population Estimate	4,978	4,978	4,978	4,978	4,978	4,978	4,978	
equals								
Per Capita Cost	168.51	254.75	120.75	8.46	24.50	167.11	288.84	
Number of Additional Employees	3,000	3,000	3,000	3,000	3,000	3,000	3,000	
multiplied by								
Cost Multipliers	0.0000015	0.0000180	0.0000332	0.0000398	0.0000503	0.0000865	0.0000444	
equals								
Percent Increase in Cost/Municipal Employee	0.0045	0.0540	0.0996	0.1194	0.1509	0.2595	0.1332	
multiplied by								
Per Capita Cost	168.51	254.75	120.75	8.46	24.50	167.11	288.84	
equals								
Dollar Increase in Costs/Municipal Employee	0.76	13.76	12.03	1.01	3.70	43.36	38.47	
multiplied by								
Existing Population	4,978	4,978	4,978	4,978	4,978	4,978	4,978	
equals								
Cost Increase	$3,774.73	$68,480.37	$59,868.86	$5,027.70	$18,400.44	$215,869.23	$191,521.49	**$562,942.82**

Notes: Cost multipliers are from Robert Burchell, David Listokin and William Dolphin, *The New Practitioner's Guide to Fiscal Impact Analysis,* 1985. Multipliers are derived from case study research on

impacts of industrial commercial uses on municipal budgets and are now accepted industry standards. In this example, one additional public safety employee in a stable or growing community, with a current population between 2,500 and 5,000, will increase per capita public safety expenditures by 0.000018%.

Applications of Alternative Cost Estimation Methods

The following table summarizes the methods presented above and their applicability. Please note, these methods are not mutually exclusive.

Technique	Residential Development	Nonresidential Development	Steady or Moderate - Growth	Substantial Decrease / Increase in Growth	New Development	Redevelopment or Infill	Development Consistent with Existing Character	Development Catalyst for Change
AVERAGE COSTING								
1. Per Capita	X		X		X		X	
2. Service Standard	X		X		X		X	
3. Proportional Valuation		X	X		X		X	
MARGINAL COSTING								
1. Case Study	X	X		X	X	X	X	X
2. Comparable Cities	X	X		X	X	X		X
3. Employee Anticipation		X		X	X	X	X	

Note: When several techniques can be used, the most appropriate approach depends on local factors.

Limitations of Traditional Methods

Heikkila and Davis (1997) challenge the six fiscal impact methods set forth by Burchell and Listokin. (The three average costing approaches include the per capita, service standard and proportional valuation techniques, while marginal cost methods include the case study, comparable cities and employee anticipation techniques.)

While Listokin and Burchell focus on fiscal impacts, literature during the late 1980s and 1990s expanded to include a discussion about impact fees. Since Nolan v. California Coastal Commission, the seminal legal case over the validity of impact fees, established that exactions imposed must relate to and provide some benefit for the development itself, techniques for setting these fees were also studied. (Connerly 1988, Nelson 1988, Stroud 1988).

According to Heikkila and Davis, methods to discern fiscal impacts and exact development fees have naturally created a need to redefine what is meant by fiscal impacts. Of the fiscal impact methods, the per capita multiplier is most often employed because of its ease of use and straightforwardness. Heikkila and Davis assert that these methods place too much emphasis on the input proxies as opposed to outputs. Outputs are really a dynamic function of the unique relationships of space and form, economic and demographic composition, and levels of service.

A method must therefore be used to account for the attributes of the development area before and after. For example, conventional methods would rely on a constant state of expenditure on a per capita or per household basis. Thus, if population grows by 5%, so do expenditures. It is the change in expenditures required to maintain a constant per capita rate of inputs that is the basis for conventional impact measures. Again, the emphasis is on the inputs.

What if a neighborhood has unique characteristics? For example, gentrification is occurring or it is an area becoming suburbanized by families. According to Heikkila and Davis, it is impossible to use standard fiscal impact methods to discern the differential impacts of individual descriptors on service levels.

The authors refer to a missing “model of production” inherent in standard fiscal impact methods. In the Heikkila and Davis approach, the “production relation” between local government expenditures in inputs and levels of service is represented by a production function, “a vector of neighborhood characteristic” (202). Consideration of this dynamic allows for the discernment of impacts by specific government services (including water supply, storm and sanitation sewers, education, and fire protection).

Dekel (1995) also contends that conventional fiscal impact analysis has failed to address the spatial dimensions of development alternatives and, in particular, the costs associated with housing density. His assessment addresses the following:

- Since analysts usually apply fiscal impact analysis on a case-by-case basis, there can be a tendency to lose "the big picture" spatially.
- Conventional approaches also tend to emphasize one dimension of variation of development (usually relating to the type of development). However, land development implies two independent variables—location as well as the type. By combining these dimensions, the density dimension emerges.
- Ruth Mace (1961) and Kushner (1992) support this view. In particular, Kushner notes that his economies-of-scale cost analysis makes no reference to two important elements: the impact of development density and of location variation (102). Failing to consider density implies that the fiscal impact of density is not presented on a continuum basis, which affects the accuracy of the estimated deviation from the current budget balance.
- Since market value property assessments do not follow the spatial pattern of costs, tax revenues do not always cover expenditures on services. In other words, some subdivisions may carry higher tax-service ratios than others. A municipality may thus have hidden deficits and surpluses.

Correcting this methodological shortcoming and determining, in budgetary terms, the optimal levels of housing densities, can eliminate the gap between taxation levels and the costs of services.

Fiscal impact assessments only look at direct impacts of development on jurisdictional services and schools, with no consideration for issues of social or fiscal equity, desired land uses, or wider economic impacts on either the private sector or individual residents. Several scholars and practitioners have identified the following concerns and limitations of using the traditional average and marginal costing approaches.

Overlapping City, County, and Service Districts

Local government services are provided by more than one public entity at various jurisdictional levels. For example, a household may receive fire protection services from the city fire department, but dispatch, 911, and search-and-rescue services from the county sheriff. Or, a school district may be responsible for a particular local school, but a separate regional authority provides water and sewer services.

Standard approaches to fiscal impact analysis typically examine the effects of development on a single unit of government. If the study includes only one

of many overlapping governmental entities, the analysis may not yield a complete picture of development impacts. At times, multiple impact assessments must be performed to get the most accurate results.

Some developments may provide a fiscal benefit to counties/regions, but not for local taxpayers. For example, a proposed development might be beneficial for a county government but fiscally negative for taxpayers. Traditional methods do not always capture this mix of financial winners and losers. In addition, they provide no formal mechanisms for estimating impacts beyond the community.

Cumulative Impacts in Changing Communities

Traditional methods tend to address the impact of only one project at a time and in isolation from other projects. Results may therefore be misleading, given that the combined fiscal impacts of many new projects differ significantly from the sum of their individual impacts.

A cumulative approach that considers all anticipated projects within a jurisdiction over time can provide a fuller view of how new development can affect a jurisdiction's fiscal position. This ordinarily corresponds to fulfillment of the community's comprehensive plan and may sometimes be referred to as the "build-out" analysis (Black 1993).

Service Costs in Rapidly Growing Jurisdictions

The shift in a jurisdiction’s revenue base or service demands is generally a function of rapid new development. This tends to be different from the rate, type, character, location, or intensity of previous development. As a result, service provision will increasingly reflect the characteristics and preferences of new residents and businesses. Service costs rarely remain constant on a per capita basis over an extended period.

In short, fiscal impact analysis for a rapidly growing jurisdiction should consider the extent to which service levels are likely to change as a result of cumulative development and to account for these changes in the evaluation of costs and revenues.

Service Costs in Fully Developed Communities

The pattern of increasing costs for new development does not necessarily apply in cities that are already built out since new (usually infill) development tends to take advantage of existing service patterns and infrastructure. For example, an analysis of 29 Minnesota counties found that the overall per capita cost for county-owned and -maintained roads tends to decline as the percentage of people residing within a county's cities increases. This is probably due to the concentration of new development and traffic in areas with excess capacity and already high levels of service (Duncan Associates 1999).

Revenues in Rapidly Developing Jurisdictions
The revenue side of the budget is also sensitive to changes in developing jurisdictions. Local revenues may be sensitive to the incomes of new residents, the market value of newly developed property, and changes in the type and amount of employment within the jurisdiction. If new residents have higher incomes on average than current residents, and the per capita market value of new development is greater than that of existing development, revenue sources are also likely to increase over time on a per capita basis.

Residential Impacts from Commercial Projects
Conventional wisdom dictates that commercial projects make money for localities because they generate property taxes and business tax receipts as well as impose lower costs than residential developments. But commercial development may also generate demand for homes for the new workers, which in turn brings additional costs that the development may wholly or partially offset the fiscal benefits. Jurisdictions should consider the combined fiscal impacts, particularly if the new commercial development is to receive any tax breaks or other subsidies.

Overly Optimistic Projections from Commercial Development
Some fiscal impact analyses not only underestimate costs but also overestimate the revenues associated with a project. There are two general reasons for this. First, developers may have unrealistic expectations about their ability to capture a share of the local or regional market for housing and commercial space. For example, a commercial developer may base the project's fiscal impact on the space being100% developed and occupied. Second, large projects are often "phased in," with later portions developed over time only if the previous phases are successful and local economic conditions are favorable. This is especially true of malls.

Interaction of Land Uses
A major limitation of fiscal impact analysis is that it does not capture the interactions among land uses when development occurs. For example, an industrial development may show a net positive fiscal impact. But it may also generate costs outside of the development that are not necessarily captured in the fiscal analysis, such as increased traffic congestion that leads to higher expenditures for street maintenance and repair. This same type of industrial development may also affect the value of adjacent properties, which is not included in the final analysis.

"Outputs are only as good as the inputs"
The most frequently mentioned weakness of fiscal impact analysis is related to the inherent limitations of any modeling technique and specific applications to the subject community. For example, many models rely on population data from the decennial census. The question remains whether this

can provide an accurate portrayal of the community in the intervening years between census reports.

Expertise in Fiscal Impact Methods
All fiscal impact models require a certain level of know-how, both to make the necessary inputs as well as to analyze and interpret the results. Correct calibration and "running" of the chosen model are especially critical. In addition, models require the input of a large amount of numerical data that must be verified both for fact and entry into the spreadsheet. Ideally, analysts have some knowledge of accounting or financial economics to interpret results.

Outputs Are Not "The Answer"
While fiscal analysis can provide important information about the direction or tendencies of impacts, policy decisions often "get bogged down by rather than illuminated by numbers. Outputs are always subject to debate, regardless of the quality of the model. Planners worry that fiscal factors may become the sole determinant of policy decisions, rather than simply one of many inputs in those decisions. Moreover, they may be wary of potential repercussions for suggesting a land use for which the model predicts that costs exceed revenues.

Skepticism of the Public
The public, too, may distrust the results of fiscal impact analysis. Taxpayers may assume they should question the numbers emanating from the analysis simply because the model represents a "black box" designed by the government.

Inaccurate Assumptions about Residential to Nonresidential Land Use Ratios
Particularly when using proportional valuation methods, nonresidential costs are based on current ratios of residential-to-nonresidential uses. This approach does not consider imminent [???] changes in land use or the actual costs associated with different land uses. For example, does existing residential development account for a greater share of certain service costs than nonresidential uses?[???]

Support for Exclusionary Zoning
Since property taxes largely determined revenues in a fiscal impact study, expensive homes yield more revenue than affordable homes. Average costing approaches, however, attribute the same service costs to all homes, thereby making expensive homes far more fiscally viable than affordable ones. Communities may use analyses like to exclude certain types of development from their boundaries.

Tradeoff Between Expediency and Accuracy
Some techniques are better suited than others for analyzing various development types and scenarios. A concern is that analysts would opt for the easiest and fastest method rather than the most appropriate one. In fact, the newer models that consider more than just the fiscal impacts of development are used less frequently than traditional models because of the complexity involved.

Alternative Methods

Cost of Community Service Studies

Traditional fiscal impact analysis methods consider 3 components jointly: housing and population, the local economy and local government finances, and project public costs and revenues from different land development patterns Critics of traditional methods assert that the findings tend to show that residential development is a net fiscal loss for communities and recommend commercial and industrial development as a strategy to balance local budgets. Working (agricultural)or open land uses are rarely included in such analyses. The American Farmland Trust (AFT) developed COCS studies in the mid-1980s to provide communities with a straightforward and inexpensive way to measure the contribution of agricultural lands to the local tax base as an alternative to other fiscal impact methods

Cost of community services (COCS) studies analyze the fiscal impact that current land uses have on local government budgets. These studies determine the cost and revenues associated with different land uses to determine if each land use "pays its own way." Rather than prescribe a course of action, these studies simply provide an assessment of a community's fiscal situation with regard to different types of land use at a particular point in time.

The results of the COCS studies are consistent with those of conventional fiscal impact analyses documenting the high cost of residential development and recommending commercial and industrial development to balance local budgets. In every community studied, farmland generated a fiscal surplus that offset the shortfall created by the residential demand for public services. This was true even when land was assessed agriculturally.

Assumptions

- Workers and residents who may live on farms are apportioned to other land uses, usually residential.
- No service costs, such as street maintenance, garbage collection, or fire protection, are assigned to agricultural uses.

Outputs of Analysis

- Set of ratios comparing annual revenues to annual expenditures for a community's unique mix of land uses.

Applicability

- Analyzes, at the municipal level the cost and revenues associated with different land use to determine if each land use 'pays its own way'.
-

Benefits

- Assesses the cost-revenue impacts of broad land use categories on a community, as opposed to the fiscal impacts of a specific development.
- Useful to begin the debate about the fiscal consequences of land use allocation.
- Relatively uncomplicated and quick to accomplish.

Limitations

- Does not predict future trends or account for differences in pattern and density within land use types.
- No costs, such as street maintenance, garbage collection or protective services are assigned to agricultural uses, even these services may be required. As a result, overall costs associated with these uses would be low or non-existent, which may not be the case in reality.
- May not differentiate between different types of open space (i.e., farmland vs. forest or vacant lots), which may have different costs and revenues.
- Does not account for amenity value or economic activity of land uses.
- Does not account for the interaction of multiple land uses.
- Does not measure the fiscal impact of a proposed development on more than one community. Depending on a variety of factors, a residential development may be of fiscal benefit to one community and a fiscal drag on another.
- Does not examine economic benefits or secondary impacts of a given land use to the community or region.
- Does not distinguish new, extensive residential uses from older, centralized or compact residential patterns, which may have different costs.

Steps and Data Requirements

The following represent the key steps and data requirements necessary to complete the COCS:

- Define land use categories.
- Collect initial local data (organize financial records to assign the cost of municipal services to working and open lands, as well as to residential, commercial and industrial development).

- Calculate a default percentage for allocation of various costs and revenues.
- Allocate expenditures by land use category.
- Allocate revenues by land use category.
- Compute the cost-revenue ratios for each land use type.

Local Factors to be Considered

Whether utilizing traditional or Cost of Community Services models, six key factors should be considered: property tax structure, the nature of the community, the type of development proposed, purpose of the analysis, level of expertise available, and accuracy and availability of information.

Property Tax Structure
Regardless of what method is employed to anticipate costs, the revenue assessment is predominantly based on property taxes. Property taxes play such a critical role in fiscal impact studies because they are still the primary funding source for local governments. Since property tax structures differ from state to state, so will the applications of impact assessments.

Several points relating to property taxes are important:

- The percentage figure used to assess value for tax purposes varies across the nation.
- The cost of municipal operations determines the amount of taxes required.
- Some states have property tax caps that only voters can overturn.
- While several state constitutions set a maximum assessment of 100 percent, several others set lower maximums (e.g., Oklahoma's is 35 percent, and Louisiana's 10 percent.)
- The use of assessment ratios has a political purpose. Most local tax jurisdictions choose to assess at a lower ratio than the state maximum allows. Politicians encounter less resistance to proposed increases in assessment ratios than to proposed increases in nominal property tax rates. Local officials can therefore raise revenue through higher assessment ratios while still claiming that the property tax rate is unchanged.

Nature of the Community
Another set of factors that influence the appropriateness of a particular fiscal impact analysis model is the nature of the community. This includes such variables as population size, land area, and population density; historic and current growth patterns; land uses and growth pressures; service delivery mechanisms (i.e., volunteer based, public sector funded, or privatized); and community values.

In general, average costing methods work well in mid-sized communities that are experiencing slow to moderate growth and where service delivery is steady and in sync with demands. Marginal costing methods are better suited for communities where growth is rapid or unexpected and new development has the potential to change the land use character as well as service delivery mechanisms. In such cases, the subjective judgments of administrators and

service providers can help build a more accurate scenario for development impacts. For example, if rapid growth causes a community to switch from volunteer fire protection to a permanent salaried force, marginal costing methods will pick up the increased costs associated with the change while average costing methods will not.

Type of Development
The most suitable model depends on the type of project being analyzed. For example, a model that uses the number of new employees as a major input is best suited to employment-generating projects such as a commercial mall or industrial park rather than a residential subdivision. Similarly, a residential infill development will have a different impact on a community's resources than a new subdivision that requires additional infrastructure and utilities.

Again, in general terms, marginal costing methods are better suited than average costing methods to analyze projects that will dramatically alter the service supply and demand dynamics in a community. In addition, some techniques (within both types of methods) are more suitable for analyzing residential developments than nonresidential projects. Within average costing methods, per capita and service standard techniques are appropriate only for residential development projects, while the proportional valuation technique is used primarily for nonresidential or mixed-use scenarios. Within the marginal costing methods, the employment anticipation technique is used only for nonresidential development while the case study and comparative cities techniques may be applied to any type of development.

Purpose of Analysis
While easier, faster, and less expensive to implement, average costing methods provide only estimates at best. If the assessment is for information and educational purposes (for example, to promote balanced land use) and estimates are appropriate, such techniques are ideal. If the assessment is to provide fiscal relief (e.g., adjust tax breaks and negotiate tax increment financing agreements) or to mitigate a fiscal burden (e.g., promote negotiated development and developer givebacks), marginal costing methods may provide a more accurate picture.

Level of Expertise Required
Some models require analysts to have more expertise than others. The average costing methods are easily implemented with available data and a basic understanding of how municipal budgets work. Marginal costing methods are more time-consuming and rely on professional expertise and knowledgeable judgments about potential impacts. Alternative methods such as cost of service studies and econometric modeling, which is described below,, also vary in terms of expertise required, with the latter being relatively easy

to implement and the former as time consuming, expensive and fairly sophisticated.

Accuracy and Availability of Data
Any analytical method or technique produces results that are only as accurate as the data it uses. Data for average costing methods are usually more readily available from primary and secondary sources, while data for marginal costing methods depend more on individual assessments or judgments about appropriate costs.

Political Dimensions of Fiscal Impact Methods: Dimensions of the Growth Debate

The sheer number of fiscal impact analysis methods reflects both a need and desire for better understanding about the costs associated with growth. Several studies or debates substantiate or refute the costs of specific types of growth (whether residential, commercial, or industrial) and its location (whether urban, suburban or rural). Regardless of the method used or the nature of the development, the political nature of fiscal impact studies is clear.

Compact Development vs. Sprawl
The general consensus in the planning literature is that low-density development is more expensive than compact development. Perhaps the most famous of these studies is the "The Costs of Sprawl" by the Real Estate Research Corporation (1974).This was followed by studies by a team that included Robert Burchell and Anthony Downs, among many others, in *Costs of Sprawl Revisited* (1998) and *Costs of Sprawl 2000* (2002). One motive for these latter studies was to transform the discussion of sprawl from an emotional debate among advocates to a reasonable estimate of actual costs and benefits by a group of "objective" analysts, i.e., "not a simple-minded rejection of sprawl, but an objective look at the alternatives" (Downs 2004).

One form of growth they analyzed was a continuation of uncontrolled sprawl, i.e., low-density growth with unlimited outward extension, dominated by automotive transportation, and leapfrog development into open space. The alternative was a more compact form of growth with higher densities, limited outward extension, more in-fill development, and more emphasis on mass transit. The study first sought to measure cost savings from more compact development on a national scale for the period 2000–2025. The authors also identified the benefits that made sprawl so dominant in the 50 years after World War II, given that sprawl did and, in many ways still does "work." In

particular, sprawl allows unlimited use of the automobile, relieves inner suburban and urban congestion, reduces suburban-to-suburban travel times, provides physical distance from urban problems, and guarantees increasing property values and good public services (Burchell et al. 2002).

The study assumes total population growth from 2000 through 2025 of 60 million. The South and West would gain 48 million people, an increase of 23 million households. Under uncontrolled development, 742 of the nation's 3,091 counties would experience more sprawl. If compact growth were adopted nationwide, sprawl could be greatly reduced in 57% of those counties. This reduction would require redirecting 11% of additional households and 6% of additional jobs in those 25 years. The West and South would experience the most redirection of people and jobs.

The compact growth scenario saves a lot of money because it involves shorter trunk lines for roads and utilities, and keeps more land in open space uses. In addition, housing units built at higher density would be smaller in size and use less land. The authors conclude that these savings are both very large and very small—large for state and municipal governments, but small when compared to national budget figures. For state and local governments providing public services, total savings of $550–600 billion over 25 years ($22–24 billion per year) might be possible. These figures do not include savings by private individuals from traveling less each year.

If the savings from more compact development are desirable, the question is what policies should governments adopt to make the shift from uncontrolled sprawl? The authors assert that a change to encourage regional governance—though not necessarily regional government—is key. This involves shifting some power over land uses from the local level to the regional or state level. Without such a change, many local governments will continue to engage in exclusionary zoning to avoid higher-density developments. The alternative is probably more a political than technical problem: most elected officials and their constituencies oppose any policies that might affect home values and the ability of homeowners to keep control over who lives nearby.

A second way to promote more compact growth, the authors suggest, is to allow construction of much more affordable housing in communities even if that means more apartments, multi-family units, or smaller homes. In many cities, residents must search for housing farther and farther from the center city, since prices fall 1.2–1.5% per mile with distance from the Central Business District (Downs 2004) Again, many suburban homeowners resist the addition of lower-cost (or higher-density) housing near their homes, since they want to protect their high market values. Overcoming this lack of political will is not a trivial challenge, despite the allure of significant cost savings at the state and local levels.

Residential vs. Nonresidential Development

The American Farmland Trust (AFT) is a leader in investigating the fiscal impacts of agricultural land conversion and has published dozens of "cost of community services" (COCS) studies across the United States. As described previously, COCS studies divide land use into three categories: residential, commercial/industrial, and farmland/open space. One of the most common procedures is to calculate a COCS ratio for each land use category, comparing how many dollars of local government services are demanded per dollar collected. A ratio above 1.0 indicates that costs exceed revenues collected from a given land category.

In a review of 70 COCS studies, the AFT reports that residential development requires $1.15 in community services on average for every $1.00 of tax revenues it contributes. Farm and forestland uses, in contrast, require only $0.35 in services for every $1.00 of tax revenue generated, while commercial or industrial uses demand just $0.27.

Studies reviewed from the Western United States include Hartmans and Meyer (1997), Snyder and Ferguson (1994), and the AFT (1999) also support of these national results, although agricultural and forest land uses in Idaho contributed more per acre on net to county revenues (1:0.48) than commercial and industrial uses (1:0.83).

The USDA also funded a study (Coupal et al 2002) which reviewed 88 COCS studies and reported that, on average, residential development required $1.24 in community services for every $1.00 of tax revenue generated, while agriculture demanded only $0.38.

These studies show that, on average, commercial, industrial, agricultural and forest uses pay for themselves from a public policy perspective, while residential development is a net drain on county coffers. There are a number of reasons for these results. First, residential and commercial developments tend to demand a high level of services per acre while agricultural and forestlands demand a lower level. Commercial and industrial land uses counter these higher per-acre service demands by paying a higher tax rate, in turn generating higher tax revenues. Residential tax rates are lower and agricultural tax rates lower still, diminishing the tax revenue generated per acre.

The bottom line is therefore positive for commercial, industrial, agricultural and forestland uses, but not for residential uses. The traditional logic is that taxing both places of business and places where employees of businesses reside amounts to double taxation. This logic is supportable as long as the business and residences are within the same tax district. The conflict arises when net revenue-generating commercial

properties and net service-consuming residential properties lie in different tax districts.

Organizations like the AFT assert that COCS studies appear reliable because of the way taxes and service expenditures are calculated and imputed. The methods used in the studies are clearly laid out. Moreover, the studies conclude that the largest single expenditure category for communities is the public school system, accounting for 60–70 percent of spending. Since open space and commercial development do not directly place any burden on schools, it is unsurprising that their ratios are less than the residential category.

It should be noted that the ratios across studies do not vary substantially, with unanimous agreement that residential land use ratios are above 1.0 and that the other types of land uses are below 1.0. The primary reason that the ratios do show variation is that communities are not identical. If, for example, many homes in a particular community are extremely high priced and occupied by "empty nesters," the COCS ratio should be relatively low. In contrast, communities dominated by low- and middle-income families with numerous children would have a higher ratio. Some communities have gone beyond simply calculating a COCS ratio to determine a "break-even" home value for their community. Not surprisingly, these values tend to be substantially higher than the median (average) home value.

Still, the AFT approach has been criticized as methodologically inadequate and as advocacy research rather than objective science (see, for example, Deller 2001, Kelsey 1996, Ladd 1998, Heikkila 2000). The principal criticisms are that the AFT approach is:

- Largely a non-statistical accounting categorization of rural and urban fiscal flows (AFT 1999). Such case study approaches may not be systematic and the results may be biased by[???] subjective assignment of service demands to the various land uses.
- Resource-intensive and generates results that are not usually transferable to other communities.
- Calculated at a particular point in time rather than over a period of years to account for changes in public investment and variation in service demands.
- Does not account for potential economies of scale and the public good aspects of public services. That is, once the school building is built, each additional student doesn’t cost nearly as much as the first students to occupy the school (at least until capacity is reached).
- Typically reports average rather than incremental (marginal) fiscal impacts. That is, there may be infrastructure capacity sufficient to accommodate the first 100 residences at little additional cost, but not

for the 101st, which throws the accounting into the negative column as new large fixed infrastructure costs are required (Deller 2001).

In terms of specific examples, a study of the fiscal impacts of alternative land development patterns in 18 Michigan communities of various types and sizes found that compact growth uses 13% less developable land, 12% fewer road miles, 15% less water utilities, 18% less sewer utilities, 6.4% less costs for residential development, and 5.2% less in costs for nonresidential growth. Cost-to-revenue ratios are 3.2% less in compact development than similar sprawl-style developments. The same study compares Michigan's costs to other findings.

Comparison of Michigan Results with Other National Studies

Savings: Compact Versus Trend (Sprawl) Growth

Area of Impact	Findings of the Field Nationally	Findings of the Michigan Study
Developable Land	20.5-24.2%	12.7%
Agricultural Land	18-19%	13.2%
Fragile Land	20-27%	11.9%
Infrastructure		
Roads (Local lane miles)	14.8-19.7%	11.9%
Utilities: Water	6.7%	15.1%
Utilities: Sewer	8.2%	18.1%
Housing Costs	2.5-8.4%	6.4%
Cost-to-Revenue Impacts	6.9%	3.2%

Source: SEMCOG, Fiscal Impacts of Alternative Land Development Patterns in Michigan, 1997.

Agriculture vs. Residential Development

There has been no shortage of studies attempting to estimate the fiscal impacts of residential growth vs. keeping land in agricultural use. The methodologies range from the snapshot approach of COCS studies to the long-term predictions of fiscal impact analyses. Yet they all show similar results: residential development requires more services and costs municipalities more than other types of land uses. In the long run, open land requires a much lower level of services than developed land, limiting increases to municipal budgets and associated spending over time.

In their study, Coupal and Seidl (2003) analyzed the relative cost of providing community services to agricultural lands versus rural residential development across the state of Colorado. The objective was to test is whether rural residential development exacts a higher cost to taxpayer s as land is moved from agriculture or forest uses The analysis presents estimates

of the fiscal impacts of rural residential development using an econometric model of county revenues, county expenditures, school district revenues, and school district expenditures. This approach calculates incremental as well as average costs. The scale of analysis was the county level, where many impacts of rural residential development are most felt and where many land use decisions are made. Moreover, it attempts to address some of the methodological shortcomings of the AFT COCS studies by using econometric models to analyze annual revenue and expenditure data across all Colorado counties for six years.

The authors found that the marginal contributions to revenues for crop and rangelands exceed expenditures. This validated the hypothesis that rural residential development is a net fiscal loss to the county government and schools, while agricultural land is a net fiscal gain.

Infill vs. Edge Development

Discussions about sprawl are not new, nor are debates about ways to curtail it. For more than 20 years, Burchell and others (Burchell et. al 2002; (Burchell and Listokin, 1995)have asserted that the fiscal impacts of sprawl are costly. In particular, the capital costs of roads are 2.0 times that of education costs, 2.5 times health costs, 8.0 times public safety costs, 8.0 times recreation/culture costs and 8.0 times economic development costs (Burchell and Mukherji ., 2003) Smart growth, the antidote to sprawl, has among its components:

1. Control of outward movement (urban growth boundaries/service areas, establishment of compact growth centers, and purchase/transfer of development rights).
2. Inner-city revitalization (including redevelopment and infill, location of public employment, streamlined permitting, accelerated brownfields redevelopment, and improved public safety and education).
3. Design innovations (such as integrated living and working environments, and creating centers and central places).
4. Conservation of land and natural resources.
5. Encouragement of multimodal transportation alternatives.

The Brookings Institute review) of academic empirical literature to weigh the extent to which a new way of thinking about growth and development can benefit governments, businesses, and regions during these fiscally stressed times indicates that significant savings can be derived from more compact development. For example projected savings nationwide between 2000 and 2025 include 11 percent, or $110 billion, from 25-year road-building costs; 6 percent, or $12.6 billion, from 25-year water and sewer costs; and roughly 3 percent, or $4 billion, for annual operations and service delivery. Muro and Puentes (2004).

Intellectual Debate Over Fiscal Impact Methods and New Approaches

The above section has shown that the validity and appropriateness of using fiscal impact analysis has numerous implications. Thus the debate relating to any of the fiscal impact methodologies continues. New methods seek to capture, not only fiscal costs, but social costs as well, others seek to further refine the most commonly used techniques (Burchell (2002) and Tischler (1988)). Other scholars call for alternative methods to truly examine the dynamics of growth and development on community services, businesses, and residents.

Average Costing
Burchell's (2002) *Costs of Sprawl 2000* is the best and most recent example of the state-of-the-art average cost method. It examined the impacts of two development patterns—sprawl and controlled (or "smart") growth—for every county in the United States. The fiscal impact models included in *Cost of Sprawl 2000* demonstrate a number of innovative features for average cost per capita type models. The models

- addressed capital costs separately from operating costs. Capital costs were explicitly examined for local roads, water, and sewer systems and operating costs were analyzed for all units of local government combined.
- included some spatial desegregation. Each county-level model estimated costs and revenues for both developed and undeveloped areas.
- tracked the conversion of land in the development process, facilitating the comparison of land use inventories—at an aggregate level—to costs and revenues.
- recognized the different impacts caused by employees and by permanent residents.

Critics, however, point out a lack of sensitivity to local capacity issues and the difficulty of applying the model to nonresidential development.

Marginal Costing
In his Sarasota County model, Tischler (1988) examined the economic and fiscal impacts of 19 prototype land uses in the county, ranging from a subdivision to agricultural land. For each prototype, the study quantified the economic impacts in terms of jobs and incomes, along with the multiplier impacts. Cost and revenue effects were measured for the county government and for the school board.

The most innovative feature of the model was its direct linkage of the economic and fiscal impacts of *each* land use. While the model does estimate the contribution of general fund revenues to costs reflected in the capital improvement plan, it examines no other contributions to capital costs. Impact

fees and special assessments were treated as offsets, with costs assumed to equal revenues generated.

Critics point to the fact that prototypes may not be truly representative of the land uses represented regardless of location, pricing, or type of construction. In addition, the Sarasota study represents a snapshot in time, with no exploration of the effect of inflation on the costs and revenues associated with the land use decision.

Other Dimensions of the Fiscal Impact debate

Fiscal impact analysis, and similar methods concentrate on assembling facts and examining alternatives; they steer clear of looking at what is right and wrong. But values, principles and even ethics are often at the heart of government decision-making, including new development. In fact the main principle underlying fiscal impact analysis, as it is currently practiced, is weighing benefits in relation to costs. But is cost-benefit the *only* principle governing decision-making? For example, if utilization of any FIA method yields the result that it costs less to build new development on open farmland, does this mean that the new development should indeed be placed there? There will be a loss of natural resources and perhaps rural amenities, but these are values that are not captured in fiscal impact .An increasing number of writers on public policy assert that efficiency is not a morally adequate principle to inform decision-making (Tryzna, 2001; Amy, 1984; Glasser, 1994). Fiscal equity techniques do venture into the realm of values by examining the relative impacts of development.

The premise of fiscal equity techniques is that new development affects different groups in different ways that the standard fiscal impact analysis cannot easily incorporate. In many states, city and town taxpayers must pay county taxes because they benefit from many countywide services. These revenue structures sometimes lead to questions of fiscal equity, i.e., whether the cost of services provided is commensurate with the taxes paid, and whether the municipalities are paying their fair share. Equity can also relate to the social impacts of new development.

A promising new technique involves developing a "social accounting matrix" to disaggregate the results of input-output economic analysis to households and workers by race, sex, age and income. A comprehensive analysis of social impacts would compare changes in the level of community well- being before and after development takes place. This technique is rarely applied, although some communities are beginning to document baseline quality-of-life indicators that will make it possible to monitor change and track future conditions.

In one case study application of this method, the Governor's Commission for a Sustainable South Florida (GCSSF) worked for several years to determine ways to reconcile urban growth needs with the restoration of the Everglades ecosystem. The commission targeted for urban revitalization a three-county

area extending along the east coast from Miami to West Palm Beach. The commission viewed the redevelopment and infill of this Eastward Ho area as essential to reducing the spread of development toward the Everglades. This major state-sponsored growth management initiative used both qualitative and quantitative measures to consider all potential effects of proposed development actions, including social, political and ecological impacts; economic costs and benefits; legal costs; and technical feasibility.

Given the intellectual debate on the merits of fiscal impact studies, it is little wonder that traditional methods are being revisited and new ones being developed. This section looks at a variety of techniques that attempt to capture the impacts of development beyond local property tax revenues and anticipated municipal costs. These newer approaches look at development from an equity, land use, or even broader economic perspective.

Econometric Techniques

Econometric techniques go beyond per capita and case study techniques to capture the interaction among components of the economy that determine supply of and demand for public goods. Statistical techniques relate public expenditures to the factors that dynamically drive demand. The specific form of equations can vary across states depending on the legal and institutional rules in place.

Conjoined Modeling Techniques

A number of researchers have been working to develop systems that link local government fiscal models to other economic models to increase their accuracy. Important recent advances include conjoining an input-output model with separate econometric models that deal with various spheres of community economic activity such as the labor market, housing, and retail sales (Schaffer 1999) In addition Johnson (1997) created a standard procedure for conjoining input-output models with fiscal and labor market models.

Federal Reserve Fiscal Impact Tool (Federal Model)

The federal model, in the form of an Excel workbook, automatically estimates the effects of proposed economic development projects on local sales and property tax revenues and on costs to local government. Estimates are based on user-provided information about the project (such as location and number of jobs) and the locality (such as tax rates and one-time government costs).

Looking Ahead

The debate concerning fiscal impact assessment will not end here. It is clear that the public has a thirst to know the likely impacts of development on their homes, businesses, and quality of life. Given the accelerating pace of growth and the increased concern over certain land use activities, this interest is understandable. Fiscal impact analyses, in essence, move the

impact discussion from no concrete knowledge to the realm of likely impacts. We can do better. Hopefully, the materials provided above will represent another step in this quest for improvement.

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