

**Methods of Valuing Land for Real Property Taxation:
An Examination of Practices in States that Require Separate Valuation
Of Land and Improvements**

Michael E. Bell
and John H. Bowman
© 2006

**Lincoln Institute of Land Policy
Working Paper**

The findings and conclusions of this paper are not subject to detailed review and do not necessarily reflect the official views and policies of the Lincoln Institute of Land Policy.

Please do not photocopy without permission of the authors.
Contact the author directly with all questions or requests for permission.

Lincoln Institute Product Code: WP06MB1

Abstract

In the United States, the same property tax rate applies to land and buildings, except in some Pennsylvania municipalities. Nonetheless, 29 states require separate values for land and buildings. Interest in taxing land more heavily than buildings recently has arisen in some states besides Pennsylvania. Where separate land and building values exist, implementing such a two-tier tax appears simple, but how accurate are the separate land and building values, if they do not affect tax liability? This paper begins to address this question through case studies of land valuation in selected localities in four states requiring separate land and building values. With ample sales of vacant land, the land component of improved parcels is estimated from these sales. Where sales of vacant land are few, each study area generally relies primarily on one of three approaches to derive land values for improved properties: **abstraction**, which calculates residual land value by subtracting depreciated replacement cost of improvements from total parcel value; **allocation**, which assigns a “typical” percentage of total parcel value to land; and **contribution to value**, which uses regression analysis to estimate the contribution to total parcel value made by various features of land and improvements.

About the Authors

Michael E. Bell is President of MEB Associates, Inc. and Executive Director of the Coalition for Effective Local Democracy. Dr. Bell is also a Research Professor at the George Washington University Institute for Public Policy. Dr. Bell's background is in public finance, with a specific focus on state and local finances and intergovernmental relations. He has recently been involved in projects to strengthen the capacity of local self-government in newly emerging democracies through in-country workshops, internships, study tours, expert missions and research projects. Recent projects in South Africa have focused on strengthening local democratic governance by encouraging greater citizen participation and strengthening local property tax administration. Dr. Bell has edited five books and published articles in several journals including *National Tax Journal*, *Public Finance*, *Urban Studies*, *Journal of Urban Economics*, *Environment and Planning C: Government and Policy*, *Public Budgeting and Finance*, and the *Regionalist*.

Contact information:

MEB Associates, Inc.

P.O. Box 869

Mc Henry, Maryland 21541

Phone: 301-387-9030

Fax: 301-387-4066

E-mail: MEBAssociates@starband.net

John H. Bowman, Professor Emeritus at Virginia Commonwealth University, served 23 years in the Department of Economics. Since arriving at VCU in 1981, he has been a consultant on tax studies in many states, including Minnesota (1984) and Virginia (2000). Among earlier positions, he was head of an Ohio Department of Taxation unit responsible for tax policy analyses and revenue estimation, and was Senior Resident in Public Finance with the former Advisory Commission on Intergovernmental Relations (ACIR) in Washington, DC. He served 12 years as a member of the editorial board of the *National Tax Journal*. Since 1995, he has worked with Michael E. Bell on a series of projects on South African property taxes, with at least partial funding of most projects provided by the Lincoln Institute of Land Policy, including their first (2004) David C. Lincoln Fellowship in Land Value Taxation.

John H. Bowman

Emeritus Professor, Virginia Commonwealth University

8201 Marwood Drive

Richmond, VA. 23235

Phone 804-745-9169

e-mail: jhbowman1@verizon.net

Table of Contents

Introduction	1
Notion of Land Value	3
Approaches to Land Valuation	5
Case Studies	8
Maryland	9
Garrett County	11
Baltimore City	13
Ohio	15
Lucas County Overview	16
Lucas County Assessment Practice	16
Lucas County Summary	20
Pennsylvania	21
Various Counties: 21 st Century Appraisals	22
Ebensburg Borough	23
Harrisburg	28
Virginia	31
Fairfax County	32
City of Roanoke	36
Goochland County	40
Summary and Conclusions	41
References	45
Endnotes	49

Methods of Valuing Land for Real Property Taxation: An Examination of Practices in States that Require Separate Valuation of Land and Improvements

Introduction

Accurate valuation of land is a critical element of land value taxation, which places a higher tax rate on land than on improvements. In its pure form, the rate on improvements is zero. Variants of the approach tax improvements, but at a lower rate than land; such hybrids are variously known as split-rate, two-tier, dual-rate, and graded taxes. For current purposes, we refer to all as land value taxation, for they all emphasize land in the tax base and require reliable estimates of land value.

Twenty-nine states formally require separate valuation of the land and improvements portions of real estate [Brunori and Carr 2002, p. 2]. For this project we proposed eight case studies in four states to document how land is valued separately for tax purposes and to ascertain what evaluation is made to gauge the quality (accuracy and uniformity) of the land value estimates.

Land value taxation is an old idea that has attracted considerable academic attention.¹ In the United States, however, it has seen only limited adoption. Several Pennsylvania cities have used the two-tier variant for many years.² These currently are the exceptions to the standard uniform ad valorem tax imposed at the same rate on both land and improvements. Recently, however, two-tier taxation has been authorized for two Virginia cities,³ and it has been considered in other places.⁴

Compared to the typical real property tax form, land value taxation is said to offer gains in both economic efficiency and equity. Both would be greatest under a pure land tax but, depending on the degree of rate differentiation, could be significant under two-tier taxation. Buildings and other improvements to real property result from deliberate decisions by people. Such decisions typically add to property value and, under the typical property tax, result in a higher tax bill. As a result, the property tax tends to discourage investment in improvements. This may show up as failure to maintain structures that already exist or failure to build structures as large or of as high quality as would be built in the absence of the tax on improvements; the first of these failures is obvious, while the second is not, but each results from decisions that have been influenced by the tax. The tendency of the tax to alter economic decisions is a form of economic inefficiency.⁵ The tax on structures also is considered by some to be unfair, because a person's actions to enhance property value force that person to give more to the support of the public sector.

Under ad valorem real property taxation, increased land values also produce higher property tax bills (assuming a constant tax rate), but there is no inefficiency because humans do not create land; rather, the amount of land is fixed by nature. Moreover, because land value generally results more from the influence of natural features (topography, soil quality, nearness of water supply, etc.) and socially created ones (nearness to transportation facilities, schools, etc.), it is said that a tax on land value is equitable. Given that most land value does not arise from the actions of the individual landowner, it is not unfair to tax the owner on the value. Indeed, it is

argued, taxing such value enhances equity, as it reclaims for the general public a portion of the value created by societal actions.

In contemplating some form of land value taxation, the manner in which land values are determined is critically important. For example, if a locality contemplates changing from uniform taxation of land and improvements to their differential taxation, the division of total value between land and improvements will determine the rates needed to raise a given amount of revenue. Alternatively stated, any given set of rates for land and improvements (which may include a zero rate for improvements) will raise different amounts of revenue, depending upon what share of total real property value is represented by land.

The issue is more complex than it may first seem. Where separate land and improvements values already exist, a logical approach to implementing a land value tax would start with those values. However, even where separate values exist, and where taxpayers have been notified of them, the split might change following implementation of land value taxation because land value taxation may be expected to bring pressures to change values that are incorrect. Estimates of the revenue and tax rate implications of land value taxation will be better if accurate land value estimates are in place at the outset. It is very important, therefore, to have some idea of how accurate the separate land values are in undertaking land value taxation.⁶

Under the typical property tax in the United States, the split of total value between land and improvements is immaterial to most taxpayers because it does not affect tax liability. For that reason, it seems likely that most taxpayers pay little attention to the split between land and improvements, even if they are informed of it by the local assessor's office,⁷ and taxpayer appeals of assessments may contribute importantly to the overall assessment accuracy.⁸ Moreover, where the split between land and improvements does not affect tax liabilities, assessors might devote comparatively few resources to making the split. A similar situation occurs with tax-exempt property.⁹ Because no revenue is at stake, it often is asserted that little effort goes into determining those values; scarce valuation resources can be put to better use trying to provide more accurate assessments that affect government revenue and taxpayer equity.

If the split became important to tax liabilities, as under land value taxation, taxpayers would be likely to take more interest in the separate land and improvements values, and so might assessors. Adjustments to existing values logically should be greater where the land-improvements split has not been carefully determined, or where a market-based valuation model has not been employed.¹⁰ The greater the changes prompted by moving to land value taxation, the greater the error in revenue estimates for a land value tax.

Our interest in this matter was raised by different experiences in studying the distributional effects of two-tier taxation in Maryland [Schachtel, Glazer, and Bell 2002] and Virginia [Bowman and Bell 2004]. Both states are in the group determined by Brunori and Carr [2002, p. 2] to require separate valuation of land and improvements. In talking with Virginia valuation officials at both the state and local levels, the authors were told that land is – must be – valued separately from improvements, and that improvements values are added to the land values to obtain total parcel values. Moreover, land sales data were said to underlie the estimates of land value in Virginia. In Maryland, however, researchers were told that total property values

typically are arrived at first using sales data for improved properties. The split between land and improvements then is made, and the manner in which it is made was not well articulated.

Although a land value tax no longer is thought to be sufficient as the sole tax to support the public sector [Netzer 1997, pp. 51-52; Walker 1962, p. 16], as Henry George's single-tax notion suggested more than a century ago, it nonetheless might contribute meaningfully to modern government finance [Netzer 1998c, Reschovsky 1998]. Even a two-tier tax, which retained improvements in the tax base, but taxed them at a lower rate than land, could provide advantages.

Whatever the form of land value tax, its implementation clearly requires separate valuation of the land and improvements portions of real estate. In a project funded by the Lincoln Institute of Land Policy, Brunori and Carr determined – through a review of state constitutions, statutes, and appellate court rulings – that the law in 29 states requires such separate valuation, while the remaining 21 states and the District of Columbia have no such legal requirement.¹¹ They also determined, through telephone surveys of 246 local assessing jurisdictions drawn from all 50 states and the District of Columbia, that (1) virtually all the surveyed units produce separate land and improvements values, whether or not state law requires such values, and (2) that most of the local assessing officials believe their separate values to be highly accurate (less than 5 percent of total value miss-allocated) [Brunori and Carr 2002, pp. 3-4].

The purpose of this project is to gain more detailed information on how separate land values are estimated, and how the accuracy of those estimates is determined.

Notion of Land Value

A basic issue, which somewhat surprisingly is not settled, is the concept of land value. One view is that the value of raw land is the appropriate value for land value taxation, while another is that the value of the site (including streets, sewers, lighting, and the general state of development of the area, though not the structures on the specific site) is the appropriate value.

Mills refers to “raw land.” He asserts that the costs of nonstructural investments to land – including clearing, leveling, drainage, surveying and plotting, utilities, etc. – should not be included in land values [Mills 1998, p. 39]. This view suggests we think of land being valued as if it were in some natural state. If the effects of any improvements are reflected in land values for tax purposes, in this view, the tax is not truly a tax on just land value.

Such an approach to land valuation, however, would undermine the purpose of moving to a land value, or two-tier, tax. One idea behind a land value tax is to capture for public benefit the increase in land value that results not from any action of the landowner, but from the actions of government (e.g., building transportation systems, installing sewers and water systems) and from society in general (increased economic activity, population growth, etc.). For example, Lindholm argues that social justice would be served if a land value tax were in place that “took into account society's right to benefit from the exploitation of its natural resources and from

land-value increases arising from society's general expansion in numbers and productivity" [Lindholm 1969, p. ix].

In this latter view, land needs to be valued for tax purposes at its current highest and best use. In other words, the logical base of a land value tax is not the value of land in some natural state, but rather the current value of land. Oldman and Teachout proposed such a definition for the base of a land value tax more than 25 years ago:

The tax base is "land value." Land value is defined to mean the value of the land in its current state on valuation day, but not to exceed "site value." Land value is defined as fair market value in the usual sense and will ordinarily be closely coordinated with cash sales prices. Site value is defined with respect to standards set for the condition of land, which signify that it is ready for currently expected highest and best use. In a typical urban area the legal definition of site value as a ceiling on land value would be the market value a parcel would have if it were level, drained, and capable of supporting the types of construction indicated by its general category of highest and best use. Specifically excluded from the definition of site value is the value of existing building improvements and any other interests in property, such as subsurface mineral rights, that do not relate to the use of the site in a "land use" sense [Oldman and Teachout 1978, p. 183].

In estimating the market value of land, assessors must determine the highest and best use (rather than the current use) of land. The application of this notion of highest and best use of a particular parcel requires some informed judgment by the assessor, who must determine

1. what uses are physically possible on a particular site;
2. which uses are legal for a specific site given zoning laws;
3. whether each use is financially feasible of providing a reasonable rate of return to the land owner; and
4. which use is the most productive one, yielding the highest net return [Wuensch, Kelly, and Hamilton 2000, pp. 7-8].

However, Wuensch, Kelly, and Hamilton argue that to understand the complexities of the various methods used to value land, one needs to understand several underlying principles of value [Wuensch, Kelly, and Hamilton 2000, pp. 9-11]. Among these, they include:

1. **Anticipation** – value depends on the highest and best use of a parcel, not its current use. That is, the value of land is the present worth of future benefits derived from the property. Estimates must be made of the stream of these future benefits to determine the value of a parcel of land.
2. **Change** – the concept of value is not constant as various forces lead to a constantly changing marketplace. Market value is determined by dynamic economic, political, and demographic factors. [See also Eckert 1990, p. 180.] For this reason, periodic reassessment is necessary.
3. **Contribution** – the principle of contribution says that value is related to effective demand for housing services and utility (as opposed to cost) [Eckert 1990, p. 318]. One must not simply add the cost of components to obtain a value estimate for the

- entirety. Taken together, the components may complement each other and thus be worth more together than separately, or, alternatively, adding a component to a property may add less than its cost to the value of the whole [Wuensch, Kelly, and Hamilton 2000, p. 10].
4. **Substitution** – the principle of substitution says that such amenities are worth no more than the cost to acquire reasonable substitutes, e.g., replacement cost approach to valuation [Eckert 1990, p. 318]. In other words, a property’s value is directly influenced by the cost of acquiring a similar asset with similar utility.
 5. **Surplus productivity** – surplus productivity refers to the income earned by land. This is what remains after returns to labor, management, and capital are satisfied. Land value is dependent on the costs of these other productive elements.

These principles underlie the various approaches to land valuation, but the approaches place differing emphases on the individual principles.

Approaches to Land Valuation

For vacant land, the preferred approach to valuation is the sales comparison, or market data, approach. It is grounded in the substitution principle of valuation – land of similar utility will yield similar prices in a competitive, open marketplace [Wuensch, Kelly, and Hamilton 2000, p. 11]. This approach uses actual market transactions for vacant land with appropriate adjustments for size, shape, corner influence, location, and topography [Eckert 1990, pp. 190-95]. Depending on land type (residential, single family, multi-family, commercial, industrial, agricultural), each market place will use different measurement methods for valuing land – e.g., front-foot, square foot, acreage, site or lot. For example, downtown retail land might be valued on a front-foot basis because exposure is important to business. Alternatively, residential sites are typically valued on a lot or site basis while agricultural properties are valued on a per acre basis [Wuensch, Kelly, and Hamilton 2000, p. 12]. The lot, or site, approach to valuing residential lots ignores relatively minor differences among parcels – e.g., the difference between 12,000 square feet and 13,000 square feet – and places the same value on all parcels that are similarly situated.

In developed urban areas, however, there may not be sufficient vacant land sales to use the sales comparison approach to valuation, and alternative techniques must be used. These also depend on the principle of substitution, but it is applied in a somewhat different manner.

The most common approach to valuing land for tax purposes in urban areas with insufficient vacant land sales is the depreciated replacement cost approach to valuation – often referred to as the **abstraction, or extraction, method** of valuing land [Eckert 1990, pp. 195-96; Wuensch, Kelly, and Hamilton 2000, p. 16]. This technique starts with the market value of the entire property and subtracts the depreciated cost of replacing the improvements. This approach to valuation is grounded in the principle of substitution [Eckert 1990, p. 318; Wuensch, Kelly, and Hamilton 2000, p. 16]. In other words, a property’s value is directly influenced by the cost of acquiring a similar asset with similar utility. The residual is then allocated to land.

This approach might work well for relatively new structures, but as time passes, economic obsolescence and depreciation increase. Adjustments for these are difficult to make, are to some extent subjective, and require informed judgments by the assessor [Eckert 1990, p. 196]. An additional caveat is necessary because of the finding that location affects the market, or contribution, value of both land and buildings, although in percentage terms the impact on land is much greater [Gloude-mans 2002]. If the abstraction method – which depends on the depreciated cost approach to arrive at residual land values – does not make allowance for the effect of location on improvement value, the land value estimates may be in error in many instances.¹² Finally, we note that valuing land as a residual after subtracting the depreciated cost of improvements from a property's total value seems to move away from the notion of market value. The housing, or other, services provided by residential, or related, improvements may or not be related to the cost of constructing a substitute structure.

A second approach to valuing land when there is few land sales is the **allocation approach**, which attributes, or allocates, a percentage of total improved parcel value to land. This approach also seems to rest upon the substitution principle of value. The land percentage is derived from market evidence and applied to individual parcels. The approach implicitly says that if land typically accounts for 25 percent of total value, for example, then 25 percent is the likely land share of value for a given property. If you can get other properties providing a given level of utility for which land is 25 percent of value, why put more than that into land?

It may be more accurate to say that the allocation percentage is deemed a good starting point for setting land value in a particular instance. How the allocation percentage is determined is of obvious importance. In jurisdictions with few or no sales of vacant land, finding evidence of the value of land is difficult. One approach is to derive the average land share, using the abstraction method, and then use that percentage in the allocation approach. This manner of deriving a land allocation percentage depends upon the construction costs and depreciation percentages used in the abstraction process being properly calibrated to the geographic area in question.

Alternatively, land sales data may be used that are not current sales in the subject area. Specifically, one approach is to use historic sales data for the locality, from a time when there were sufficient land sales. This runs the risk of missing a change in the relative value of land over time. A second approach is to use more contemporaneous land sales from another locality, where sufficient land sales exist. This approach also has its risks, because the "donor" sales area will differ from the one for which an allocation percentage is being calculated, and if appropriate adjustments are not made, erroneous land value estimates will result.

Market value of land may be estimated more accurately using the **contribution value approach**. Market values emerge from arm's-length transactions for a number of properties that are reasonable substitutes in terms of the utility they provide – e.g., in the case of residential properties, essentially the same housing services. An informed buyer might be willing to purchase any of several homes on the market at a given time. However, because no two properties are exactly alike (they will differ at least in their location, however slightly), the buyer may not be willing to pay the same for each property. Differences deemed important will translate into different prices that the buyer will be willing to offer. Some features of a property may add either more or less than their replacement costs, as evaluated by the typical buyer. An old, but still sound barn on a site in an area no longer used for farming may add less to value than

its replacement cost, in the eyes of buyers looking for only a residence. Alternatively, a garage might be added to a new house for less than the added amount the typical new-home buyer would be willing to pay to have a garage. Such considerations suggest that the abstraction method may err in its generation of land values, and the allocation method may not do better,

The notion of market value seems to be more closely aligned with the principle of contribution to value – that is, how much does each characteristic of site and improvements contribute to the market value of the particular parcel? The most appropriate analytical tool for addressing these questions is a statistical model that explains the sales price of individual properties as a function of the land and improvements attributes.

Mills expresses misgivings about this approach to land valuation. He asserts, “There is no prospect of a hedonic equation that would be adequate to assess site values of developed residential properties; much less a prospect of an equation that could assess site values of developed commercial property; and there is simply no other way to estimate site values of developed properties” [Mills 1998, p. 47]. Mills is too categorical in his conclusion. One must start, as Mills acknowledges [Mills 1998, p. 44], with the understanding that assessment of real property for tax purposes is still as much art as it is science. One must also acknowledge that assessments must be developed for tax purposes. The challenge is to inform the assessor's judgment as fully and as clearly as possible. The literature includes several examples of hedonic pricing models that seem to make a contribution.

Ashley, Plassmann, and Tideman address the question of how accurately developed commercial land can be assessed in an urban center where there are limited or no sales of such land. They use sales in downtown Portland, Oregon, to develop and test a combination of a simple hedonic model of the value of improvements to commercial property plus a quadratic smoothing technique. They conclude that while there are relatively few sales of downtown commercial land in Portland, the available information could be used in creative ways to develop reasonable estimates of land value for developed commercial properties. Their model predicted land value for improved downtown commercial land better than the model used by assessors in the city,¹³ and they conclude that the performance of the method was good enough to warrant further study [Ashley, Plassmann, and Tideman 1999].

In a related effort, Gloude-mans tests the ability of modern mass appraisal techniques to develop separate estimates of land and building values for urban residential properties. He uses data from three large North American metropolitan areas – Ada County, Idaho (Boise); Edmonton, Alberta; and Jefferson County, Colorado (suburban Denver) to test both a traditional “additive” multiple regression model typical of those used by assessment authorities and a “hybrid” model using nonlinear regression analysis. Results of the nonlinear models are tested on combined sales and separately on improved and vacant land sales. Based on his research findings, he concludes that modern mass appraisal methods can be adapted to estimate both vacant and improved residential land values with reasonable accuracy, even when there are no or few vacant land sales in certain areas [Gloude-mans 2000].

In a separate research project Gloude-mans, Handel, and Warwa test the efficacy of different models, based on different data sets, in estimating the value of vacant land in urban, built-up,

areas. Their concern is the fact that the appraisal of vacant residential land tends to be comparatively difficult and studies of assessment performance consistently show values to be far less accurate or reliable than for improved residential properties. They test three different models to estimate the value of land – a land model using only vacant land sales; an improved model using only improved sales; and a combined model using both vacant and improved sales. If the combined model could perform as well (or nearly as well) as the individual models in estimating land value, they should be able to perform even better in other, older, areas with fewer vacant land sales. They conclude that the combined model, using both vacant and improved sales, performs as well as the individual models. Thus, a combined model lends stability to vacant land values and provides much needed market benchmarks where vacant land sales are lacking [Gloude-mans, Handel, and Warwa 2002].

We conclude that the contribution principle of value seems more consistent than either the abstraction or allocation principles with the notion of market value; that market data will capture the value represented by the anticipation principle better than a cost-based approach; and that there are adequate analytic tools available to estimate with reasonable accuracy independent land and improvement values.

Case Studies

We set out to conduct detailed case studies of land valuation procedures and evaluation in eight local areas – one urban area and one rural area within each of four states. It is desirable to include both rural and urban areas, because of the different mix of properties and valuation issues likely to arise in the two. Several states are included in this part of the research to get a better feel for the range of practice; budget and time considerations resulted in targeting only four states for the detailed case studies. The four states visited are Maryland, Ohio, Pennsylvania, and Virginia. We ended up with more than eight study areas because we have more than two in both Pennsylvania and Virginia. However, we have only one study area in Ohio because all the smaller counties are assessed by contract appraisal firms, and we did not succeed in getting time with one of them for this study.

Pennsylvania is included because of the existence of two-tier taxes there. Because the breakdown of total parcel value into its land and improvements components already is important to the determination of tax liability in many cities, the valuation approach and related experiences there will be of particular and obvious interest.

Ohio also requires separate valuation of land and improvements, although a court decision holds that “the tax is on the aggregate value of land and improvements” [Brunori and Carr 2002, p. 18]. Another reason for including Ohio is the use of modern technology in real property valuation in Lucas County (Toledo), as presented by the county’s Chief Assessor at a Lincoln Institute program in Washington, DC, in June 2004 [German 2004]. Imaginative, cutting-edge things are being done there in estimating land values, as well.

Maryland and Virginia are included principally because we thought we had identified, through some earlier work, a difference in these states’ approaches to determining the split between land

and improvements, as noted above. To reiterate, Virginia valuation officials at both the state and local levels had told us that land is, and must be, valued separately; that land sales data are used to develop land values; and that improvements values are then added to the land values to determine total parcel values. In Maryland, however, researchers were told that total parcel values typically are arrived at first, using sales data for improved properties, and then the split between land and improvements is made. However, the manner in which the land component is determined was not at all clear to us at the start of this current research.

A basic questionnaire was developed for all the case study areas. This was provided to the people in each area in advance of our visit, so they would know what to expect and be able to pull together information before our arrival, and it served as the point of departure for the discussions during the site visits. The questions are the following:

1. Are there rules or other guidelines provided by the [appropriate state agency] pertaining to the requirement for separate valuation of land and improvements? If yes, we would like to obtain a copy, if possible.
2. Does the state provide any specific guidance or direction regarding the manner in which (a) land values and/or (b) improvements values are to be determined? If yes, we would like to obtain a copy, if possible.
3. Is more than one approach used to estimate market values of land B e.g., building lots as opposed to larger tracts of land?
4. Has the approach to valuing land changed in [name of jurisdiction] in recent years? If yes, what was the nature of the change, and what prompted it?
5. Is there written documentation for the model(s) you use to arrive at land values that you can share with us? This would be for our own edification, and we would respect whatever limits you suggest as to disclosure in our report to the Lincoln Institute, etc. (e.g., use of a summary description, rather than precise formulas or algorithms).
6. Do you have some means of gauging the accuracy of the land values? For improved parcels, assessment-sales ratios seem obviously not to serve this purpose.
7. What use is made of the separate valuations, either in your office or otherwise? For example,
 - a. Can appeals be based on the separate components, or just the total parcel value?
 - b. Can taxpayers readily find the separate values of the two components of real estate values for parcels in your jurisdiction, other than their own?
 - c. Are the separate values reported to the state, either for individual parcels or for the sum or all parcels in the taxing unit?

Maryland

Property taxation is the major source of local tax revenue in Maryland, as it is nationally, but the degree of reliance is less than in the other three study states. Based on Census data for 2003, property taxes account for 73 percent of all local taxes nationwide; the Maryland property tax share is 57 percent, and it is between 66 percent and 72 percent in our other three study states.¹⁴ For nearly 40 years, there has been a local income tax, which is piggybacked on the Maryland

state tax. Levied in all 23 counties and the city of Baltimore, it accounts for 32 percent of all local tax revenue in Maryland; this is well above the national average.

Maryland is the only one of our four case study states where property assessments are done by a state agency – the Department of Assessments and Taxation – rather than by local agencies. However, the state maintains an assessment office in each county and the city of Baltimore because the law requires that all property subject to taxation shall be assessed by the supervisor for the county where the property is located (§8-202). Railroad and public utility property (both real and personal), as well as business tangible personal property, are assessed centrally by the state Department of Assessments and Taxation, not the local assessment offices.

Real estate in Maryland is to be assessed and valued according to the Maryland State Assessment Manual. The manual makes it explicit that value is understood to mean market value, which is defined by the Appraisal Foundation in their *Dictionary of Real Estate Appraisal* as “the most probable price which a specified interest in real property is likely to bring under all of the following conditions:

1. consummation of a sale as of a specified time
2. open and competitive market for the property interest appraised
3. buyer and seller each acting prudently and knowledgeably
4. price not affected by undue stimulus
5. buyer and seller typically motivated
6. both parties acting in what they consider to be their best interests
7. adequate marketing efforts made and a reasonable time allowed for exposure in the open market
8. payment made in case in U.S. dollars or in terms of financial arrangements comparable thereto
9. price represents the normal consideration of or the property sold, unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.”

In other words, market value is the most probable price that a property will sell for under normal market conditions, based on the concept of an open and competitive market transaction free of duress.

Maryland law says that the Department of Assessments and Taxation shall attempt to determine the most effective and equitable method to assess property (§2-208). The Maryland State Assessment Procedures Manual translates this requirement into the following guidelines

“In determining full cash value, the following factors may be considered:

1. recent sales of similar properties;
2. replacement costs, less accrued depreciation; and
3. in the case of rental or commercial properties, a fair and reasonable capitalization of income.”

The Manual continues by saying the assessor may consider all three approaches to value choosing the most appropriate approach that will result in a uniform valuation of all properties.

The state has developed a Computer Assisted Mass Appraisal (CAMA) model used to value residential properties. Market data are used to value dwellings, accessory structures, and land separately. In part, this reflects the requirement in § 8-104 (a) of the Maryland Property Tax Code, which requires that land and improvements on land be valued separately. In fact, this section of the Maryland Property Tax Code is grounded in the state constitution, which, in Article 15, states "...that the General Assembly shall, by uniform rules, provide for the separate assessment, classification and subclassification of land, improvements on land and personal property, as it may deem proper..."

According to the Maryland Assessment Procedures Manual, land values should be determined from comparable land sales data and standard site evaluation techniques of similarly zoned properties. Land values may be reported by square foot, front-foot, acres, or lot depending on the character of the land being valued.

According to the *Homeowner's Guide to Property Taxes and Assessment*, the Department of Assessments and Taxation indicates that assessors review and analyze land sales to determine the value of location factors that influence land values. In the absence of sufficient land sale information assessors estimate the value of the land using an allocation or percentage method. This method employs the valuation of the total property, using property sales of similar houses, and then separating land and improvement values based on a percentage of the total for each component.

To understand how these general guidelines for valuing land for tax purposes are implemented at the local level, we interviewed assessors in Garrett County and Baltimore City.

Garrett County

Garrett County is the western-most county in Maryland. The estimated 2004 population for the county is 30,124, making it the county with the third smallest population in Maryland.¹⁵ The population density for the county is 46 people per square mile compared with 542 people per square mile for the state as a whole. It is not part of any metropolitan area.

In 2002 there were 17,121 housing units in the county; only 11,476 of these were occupied at the time of the census, reflecting, in part, the fact that the county is a recreation destination and has a large number of second homes among its housing units. Based on 2000 census data, 85 percent of owner-occupied housing units in the county were valued at \$150,000 or less, and 30 percent of total housing units were built before 1960.

Average household income in the county is \$32,238 – just 61 percent of the state average of \$52,868. For the county, 13.3 percent of the population lives below the poverty line, compared with just 8.5 percent for the state as a whole. Of those over 25, approximately 80 percent in the county have high school diplomas (compared with 84 percent for the state), and 13.8 percent have bachelor's degrees (compared with 31.4 percent for the state).

Garrett County has approximately 30,000 properties on its tax roll. In 2004 there were nearly 2,400 property transfers. A number of these transfers are a result of the state selling to owners of lakefront properties on Deep Creek Lake a portion of the buffer strip around the lake. In addition, a number of transfers were merely transfers of ownership, not arm's-length sales. It is estimated that there were approximately 1,600 arm's-length residential sales in the county in 2004.

The county is divided into 18 assessment districts. Seventeen of those districts correspond to election districts in the county. The eighteenth district is a special assessment district for Deep Creek Lake properties.

In Garrett County, there are generally sufficient land sales that market data can be used to value land for the different types of properties in the county. The sales are stratified by assessment district and then plotted on a map by road. In this manner, similar properties are grouped together to determine land values in different areas within individual assessment districts.

In the Deep Creek Lake assessment area, properties are divided into different groups according to lakefront, lake access, and lake view. Vacant land sales are then used to determine values for each group, with individual properties in each group valued on a site, or lot, basis. This approach assigns the same values to parcels of somewhat different sizes that are otherwise similar, rather than adding value for additional square footage to the larger parcel.

In addition, there are generally sufficient vacant land sales to use the sales comparison approach to valuing land in urban centers such as Oakland and Grantsville, as well. In such areas, land is generally valued on a square foot basis, except for new subdivisions, which are generally valued on a site, or lot, basis.

Finally, various techniques are used to value farm and forest land. Generally, such rural land is valued on a per acre basis. For example, land qualifying for valuation under various state programs to tax agricultural and forest lands at use value, rather than market value, has its value determined by the legislature. Specifically, the legislature has statutorily set land values at between \$125 and \$500 per acre for agricultural land, depending on the historical use of the land. Similarly, the legislatively established value of woodlands is either \$125 or \$187.50 per acre, depending upon the state program under which the land is being valued.

In summary, the answers to the seven questions in our questionnaire (above) for Garrett County are as follows:

1. The state mandates that properties will be valued at market value, but allows any of three general approaches to be used to estimate such values; the comparable sales approach is used in Garrett County to value land.
2. No specific guidelines are provided by the state regarding valuation techniques, or approaches, except for agricultural and forest use-value assessments. This is left to the experience of the assessor in each county.

3. Yes, more than one approach is used in valuing land. Typically, market value is used, but this is supplemented with the income approach for some commercial properties.
4. No, the approach to valuing land has not changed in recent years.
5. No, there is no written model documentation that can be shared.
6. Assessment sales ratios are used to determine compliance with guidelines from IAAO (International Association of Assessing Officers). Assessment-sales ratios do not work well for agricultural or forest land that is in one of the state's use-value assessment programs since it would involve comparing use value to market value.
7. Regarding the separate values for land and improvements:
 - a. Appeals are only on the total value.
 - b. Yes, taxpayers can get access to date from the Internet.
 - c. Yes, separate land and improvement values are reported to the state.

Baltimore City

Baltimore is the largest city in Maryland. It is an independent city, with no overlying county government.¹⁶ According to the 2000 census, the city had a population of 651,154, which was 12.3 percent of the state's population. However, while the state grew by 10.8 percent between 1990 and 2000, Baltimore lost 11.5 percent. Nearly two-thirds of the city's population is black or African American and approximately one-third is white – just the opposite of the state as a whole. The population density of the city is over 8,000 people per square mile, compared with 542 people per square mile for the state as a whole.

According to the 2000 census, there were 300,477 housing units in Baltimore. About 50 percent of city households own their own residences, compared with two-thirds of households statewide. The median value of owner-occupied housing in Baltimore was \$69,100 in 2000, compared with \$146,000 for the state as a whole.

Baltimore is one of the poorest jurisdictions in the state. The city has a median household income (in 1999) of just \$30,078 – only 56.9 percent of the statewide median household income (in 1999) of \$52,868. Nearly 23 percent of the city's residents live below the poverty line, compared with just 8.5 percent of all people living in Maryland. Just over two-thirds of the city's population over 25 had graduated high school, compared with 84 percent for the state as a whole.

Unlike Garrett County, or most other jurisdictions in Maryland, Baltimore does not have many vacant land sales. Therefore, the city relies upon the allocation method to estimate land value. The percentage of total parcel value allocated to land in Baltimore is derived from the experiences of other jurisdictions, modified or refined in line with actual experience in Baltimore. Several years ago, land was generally thought to account for about 25 percent of the total value of a parcel. Recently, however, the share of total value allocated to land has been increasing and is currently running in the 35 to 40 percent range. Historically, as land has come to be a larger share of total parcel value, the city has lagged other Maryland localities in this regard. The historic relationships are used to arrive at this statistic for Baltimore, working from data for other localities where land sales allow more direct calculation.

For new construction, actual construction costs, in conjunction with land acquisition and preparation costs, determine the first approximation of value. These actual figures, and the share of total value accounted for by land acquisition and preparation, are used to test or refine the allocation assumptions used for other similar properties.

The city uses a CAMA model developed and run at the state headquarters of the Department of Assessments and Taxation. The CAMA model is a guide for developing estimates of current building costs. The cost manual underlying the CAMA model reflects 2000 construction costs. The characteristics of a property are fed into the model and the model estimates the cost of constructing a similar structure using 2000 construction cost data. This is called the Total Dwelling Base Cost. Then the assessor makes adjustments for depreciation and obsolescence. These adjustments reflect the age of the structure and its general condition, which is evaluated by the assessor as part of a physical visit to the property every three years (one-third of the city each year).

At this point, the value of an individual property reflects the estimated land value determined by the allocation method and the replacement cost of the structure. The assessor then takes one further step to determine actual assessed value of an individual property. This final step is intended to reflect market pressures of different neighborhoods. Specifically, a Market Value Index (MVI) is calculated, which links the replacement cost and market comparison approaches for residential properties. The MVI is a multiplier, carried to two decimal places, that can be greater than, less than, or equal to one. It is included on the property record card and is applied after the application of depreciation. Different MVI values may be calculated for different types of housing within homogeneous areas, documented on an appropriate departmental form, reviewed and approved by supervisory personnel.¹⁷

As an example, consider two identical houses that would generate the same replacement cost estimates, but that are located in different neighborhoods. One neighborhood is undergoing gentrification and the other is in decline. As a result, a buyer might pay more for the house in the gentrifying neighborhood than in the declining one. In other words, there are market factors that influence final values. Assessors estimate these market factors by neighborhood and type of property and then adjust the estimated assessed values accordingly. In effect, this step moves the valuation process from one based strictly on the replacement cost of a structure to one that starts to recognize the contribution value of housing and neighborhood characteristics to the market value of a property.

For commercial and industrial properties it turns out the city actually has a number of useable sales of vacant land to use to estimate land values. These sales are used to verify and/or refine the assumptions underlying the allocation method of valuing land in areas where there are not sufficient vacant land sales.

In summary, the answers to the seven questions in our questionnaire (above) for Baltimore City are as follows:

1. The state mandates that properties will be valued at market value and Baltimore City uses the allocation method as a first approximation of land value.

2. No specific guidelines are provided by the state regarding valuation techniques or approaches. This is left to the experience of the assessor in each county.
3. Yes, more than one approach is used in valuing land. Primary reliance is on the allocation method, which is informed by sales data from the city, for commercial and industrial properties, and from other jurisdictions for residential properties.
4. No, the approach to valuing land has not changed in recent years.
5. No, there is no written model documentation that can be shared.
6. There is some effort to confirm, or evaluate, land values through the use of the state's CAMA model.
7. Regarding the separate values for land and improvements:
 - a. Appeals are only on the total value.
 - b. Yes, taxpayers can get access to date from the Internet.
 - c. Yes, separate land and improvement values are reported to the state.

Ohio

Local property taxes account for 66 percent of local taxes in Ohio, compared to 73 percent nationwide. This is explained, at least in part, by the availability of local income taxes for both municipalities and school districts. Municipal income taxation commenced in the early post-World War II period, while school district income taxes came several decades later, and their yield is much less significant. The latest data, for calendar 2003, show over 550 municipal income taxes in the state with a yield of \$3.4 billion, compared to about \$0.2 billion from 145 school district taxes.¹⁸ Strict property tax limits put in place by the 1929 state constitution restrict aggregate "un-voted" tax rates for all overlying units of government in an area to 10 mils; given the state's later move to a fractional assessment standard, this is a cumulative effective tax rate of just 0.35 percent, assuming the assessment-level standard is met. For a unit to levy a rate higher than its share of the un-voted rate requires approval in a referendum.

As a result of this combination of tax provisions, many municipalities in Ohio levy only the property tax rate allowed without a referendum and rely much more heavily on income taxes. For both calendar years 2002 and 2003, state data show \$3.4 billion of municipal income tax revenue, compared to only \$813 million from property taxes in fiscal 2002 – about one-fourth as much as the income tax. Nationally, property taxes accounted for 48.6 percent of municipal taxes in 2002, but in Ohio they accounted for only 18.2 percent. The reliance on non-property taxes is especially pronounced among larger municipalities, which heavily influence the average figures. In Ohio, the four municipalities with over 300,000 residents accounted for 33 percent of all taxes levied by the state's 942 municipalities, but they accounted for only 23 percent of municipal property taxes [Census Bureau 2005, Table 13, p. 108].

Real property tax administration in Ohio is lodged in the office of the county auditor, an elective office. State law requires reassessment every six years, with an updating of assessed values in the middle of the reassessment cycle. The cycles are staggered, so that only a small number of counties is reassessing in any given year. In the majority of the 88 counties, reassessment is contracted out to private appraisal firms, a practice that no doubt is facilitated by the staggered assessment cycles. Some of the large counties do reassessments in-house, and in such cases, the

real property tax office is a unit within the auditor's office, headed by a chief assessor. Assessed values are to be set at 35 percent of market value at the time of reassessment and the interim update.

As noted earlier, we were unable to include a rural Ohio county among our case studies because they are assessed by private appraisal firms, and we did not get appointments with any of them. As a result, Lucas County is the only Ohio area included in the study. It is an important area to have included in the study, though, so we stayed with Ohio as one of our four states.

Lucas County Overview

Lucas County is in northwest Ohio, at the western end of Lake Erie. The principal city is Toledo, which accounted for nearly 70 percent of the county's population in 2000 (313,619 out of 455,054). At the time of the 2000 census, there were 1,336 people per square mile in Lucas County, while the population density in Toledo was nearly three times as great, at 3,890. Like many central cities, Toledo has been losing population, registering a decline of 5.8 percent between 1990 and 2000, and an estimated further loss of 1.5 percent between 2000 and 2003.¹⁹ Lucas County as a whole lost population over these intervals, as well, although at a slower rate (1.6 percent and 1.0 percent, respectively). By comparison, Ohio's statewide population increased by 4.7 percent during the 1990s and is estimated to have risen another 0.7 percent by 2003.

The population of the area is relatively poor. In 1999, 13.9 percent of the Lucas County population was below the poverty line (17.9 percent for Toledo), compared with 10.6 percent for the whole of Ohio and 12.4 percent nationwide. Median household income data for 1999 tell a similar story: \$38,004 for the county, \$32,546 for the city, \$40,956 for the state, and \$41,994 for the nation. The county's homeownership rate of 65.4 percent in 2000 is close to the national average (66.2 percent) but below the state average (69.1 percent), while Toledo's rate, at 59.8 percent, is below that for all these larger areas. Median home values in the county (\$90,700) and city (\$75,300) are below those for the state (\$103,700) and the US as a whole (\$119,600).

Lucas County Assessment Practice

We selected Lucas County as one of our case-study areas because, through various professional meetings, we had become aware that it is in the forefront of applying some new technologies to property valuation.

Lucas County is one of the few Ohio counties doing in-house assessments, with county staff in the Real Estate Division in the County Auditor's Office; Jerome C. Germon is Director and Chief Assessor. The county actually has a hybrid system, in that the staff is augmented by a long-term contract with CAMA consultant Richard D. Ward, and it also engages the services of a contract appraisal firm for some of the work with business properties. Over the last few reassessment cycles, the county has changed valuation methodologies, and Dr. Ward has been active in that effort. He was part of the group that met with us in Toledo, along with Mr. German and two other members of the property tax staff, Jason Guilford and Brian Jones.

Lucas County has been changing its valuation modeling over the last few reassessment cycles. Until 1982, the cost approach was used; this, we were told, is still the most common method around the country. Because cost data pertain only to improvements, land values must be derived separately; thus, separate land and improvements values are generated under this approach, even if not required by law. Starting in 1982, however, Lucas County has placed primary reliance on the sales comparison method. Recently, a cost approach has been developed using Marshall-Swift data, calibrated for the Lucas County setting using market values. The sales comparison approach is said to drive values for all residential properties, including condominiums but excluding apartments, and also for all industrial properties and non-residential land. The capitalized income approach is the value driver for improved commercial properties and apartments.

A good idea of the Lucas County valuation system is provided by two *Assessment Journal* articles [Ward, Weaver, and German 1999; and Ward, Guilford, Jones, Pratt, and German 2002], although some changes have occurred since these were published, and details of those changes are not yet available to be made public.²⁰ Both published papers focus on improving location variables for CAMA analysis. The earlier one argues that, while use of fixed-boundary neighborhoods – with a single location multiplier for all properties within each neighborhood – improves CAMA performance, this adjustment is not sufficiently precise; differences within neighborhoods are missed by such location factors. Moreover, GIS technology allows development of more precise location multipliers, which are derived from geographic response surface analysis (GRSA). Using x,y coordinates, GRSA assigns different multipliers to each cell. Cell size can be varied, and for the Lucas County data, the optimal cell size was determined to be 0.01 miles – about 50 feet [Ward, Weaver, and German 1999, p. 34].

In the published analysis, areas with the highest and lowest values are identified visually from plotted data and used as value influence centers (VICs). The coordinates of these VICs are determined, and each parcel's distance from each of these centers is calculated. In preparation for interpolating the GRSA results from the sample of properties to the entire area of the county (or other assessment jurisdiction), cell size is determined and “breaklines” – e.g., rivers, major highways, school district boundaries – are determined, which constrain the interpolation. The resulting grid provides location value factors that are assigned to individual properties for incorporation into the CAMA model. When the CAMA model was run with no location variable, only 38 percent of the estimated values for sold properties were within 20 percent of the sales prices. When the GRSA-derived location factors were included, 85 percent of the estimated values were within 20 percent of sales prices [Ward, Weaver, and German 1999, p. 36]. As the approach has evolved, neither VICs nor breaklines are used; instead, the ArcGIS GeoStatistical Analyst software is used.

In this initial effort, sales prices and sales prices per square foot of sold residential properties were plotted and used to estimate the response surface. Because the location factors were then used in a CAMA model to explain sales prices, there was some criticism of the process for using sales prices on both sides of the model [Ward, Guilford, Jones, Pratt, and German 2002, p. 16]. The second study repeated the exercise using property attributes known to correlate well with sales prices. Using R-squared, coefficient of dispersion (COD), and price-related differential (PRD) values to evaluate model performance, GRSA location factors derived from analysis of

land characteristics did not perform as well as those derived from sales prices, but location factors derived from buildings came close to matching the price-derived factors [Ward, Guilford, Jones, Pratt, and German 2002, pp. 20-21]. Encouraged by this, the Lucas County analysts then used building characteristics for the universe of improved residential properties in the county to estimate a response surface. This increased the number of properties from the 6,200 sold properties to the more than 128,000 improved residential properties. This improved model performance somewhat, matching the R-squared and COD statistics from the sales-based response surface, but leaving the PRD unchanged and thus still somewhat worse than for the sales-based surface (103 vs. 102) [Ward, Guilford, Jones, Pratt, and German 2002, pp. 21-22].

The authors conclude that the use of building characteristics to construct a location variable works well and overcomes the criticism of using sales prices on both sides of the CAMA model. They also note that it provides a way to develop a location factor better than fixed-boundary neighborhood dummies even in jurisdictions with few sales. However, they note, “the final valuation model must still be built on sales that may or may not be representative of the universe” [Ward, Guilford, Jones, Pratt, and German 2002, p. 23].

Another section of the 2002 paper addresses separately the matter of deriving land values for vacant residential land. The authors note that, “In Ohio, all land must be valued as vacant regardless of whether the parcel has a building on it. This represents a significant dilemma if one agrees that there is a different market and, therefore, different values for vacant and improved land” [Ward, Guilford, Jones, Pratt, and German 2002, p. 23].

To address the need for generating land values, they develop a classification of neighborhoods (252 in Lucas County) intended to capture different supply and demand forces. Specifically, they define four classes of neighborhoods reflecting the stage of development: developing, mature, raw, and developing-raw [Ward, Guilford, Jones, Pratt, and German 2002, pp. 23-24]. They are differentiated by such factors as the number of vacant parcels, the portion of the area represented by vacant parcels, the number of sales of vacant parcels, the turnover rate for vacant parcels (sales relative to number of such parcels), and the extent – if any – to which there are sales of agricultural land. After providing specific thresholds for these variables, each neighborhood was automatically (in an Access database) assigned to one of the four stages of development [Ward, Guilford, Jones, Pratt, and German 2002, pp. 24-25]. Once this was done, vacant land sales were modeled.

Analysis started with 1,006 sales of vacant residential and agricultural land including “both valid and invalid sales” [Ward, Guilford, Jones, Pratt, and German 2002, p. 26]. Working with sales price and sales price per square foot, the data set was reduced to 942 sales by eliminating sales with prices or prices per square foot above or below specified values.

The model developed to explain prices of sold land uses such variables as foot-frontage, lot size, neighborhood stage, whether the area is unplatted, land influence, and traffic pattern [Ward, Guilford, Jones, Pratt, and German 2002, pp. 26-27]. Both the frontage and lot size variables were separated into two variables, to reflect the notion that increases beyond some base level add less to total value. This is consistent with the notion of contribution value, discussed above. The other variables are categorical (dummy) variables, and scalar (linearized) values were developed

for these. For frontage, the base value selected is 50 feet, and the excess frontage variable is simply the difference between this and actual frontage of a parcel. For lot size, the base size is 20,000 square feet, and the excess size variable is the square root of the difference between this and actual lot size. The neighborhood stage variable is described above. The unplatted variable identifies land not yet laid out for residential development. To capture the influence of traffic pattern, four road types are identified: main, secondary, private, and no outlet; secondary is the baseline, and is excluded from the model. Land influence is represented by 11 variables: ditch, golf view, other positive, community pond, river unusable, river usable, swampy, size/shape, unbuildable, wooded, and private pond. A 12th variable – no influence factor – is the baseline, excluded from the model

Results for this base model, with no location factor, are poor: R-squared = 0.50, COD = 65, and PRD = 149 [Ward, Guilford, Jones, Pratt, and German 2002, pp. 26-27]. The authors note that these results do not meet IAAO guidelines for assessment accuracy. Adding a location variable developed from GRSA using sales price data to estimate the response surface (as in the 1999 paper) greatly improves the results, meeting IAAO standards: R-squared = 0.957, COD = 13.1, and PRD = 101.8 [Ward, Guilford, Jones, Pratt, and German 2002, pp. 27-30].

The authors conclude this section of the second paper with a consideration of possible next steps [Ward, Guilford, Jones, Pratt, and German 2002, p. 30]. They suggest using land values derived in the manner described here and subtracting the estimated land values from improved property sales prices to derive residual building values. This would reverse the usual abstraction approach. Perhaps it would overcome some of the problems associated with deriving depreciated replacement costs, but it still would fall short of implementing a contribution value approach. The authors suggest that the building-residual values be used as the dependent variable in a model to explain building values. They note, “Applying both land and building models across all residential properties should produce equalized land values (for vacant and improved parcels) relative to market prices as well as equitable total values. This approach can sometimes result in negative building values” Ward, Guilford, Jones, Pratt, and German [2002, p. 30]. To avoid negative land values, they note that the land value could be “frozen” (coefficient fixed at 1) in a hybrid model.

In our meeting, the Lucas County property tax officials indicated that current practice does include freezing land values in the manner described in the article just cited. That is, land values are estimated based on market sales data, in the case of residential properties, and the values are plugged into the full model, rather than being estimated within the full model.

In applying the sales comparison approach, it is necessary to augment sales in some neighborhoods. That is, "proxies" are used where there are few sales that provide appropriate market price information. This is done, as needed, for all property types for which values are driven by the sales comparison approach – i.e., all but improved commercial properties and apartments. Consider the case of commercial properties. Neighborhoods are defined for convenience. Within a neighborhood, there are various numbers of tracts of various sizes. To develop the proxy measures, the highest and best probable use was determined for each property. One property of each size and use was picked from each neighborhood, if such properties were found in each neighborhood. Land values for the selected properties were then determined by

top appraisers, who were provided any available sales data and the time needed to perform their task properly. The appraisers were given discretion to decide whether available sales represented good market sales. It was noted that some actual sales are not representative of the overall market, and thus cannot be used. Having representative land values is essential in estimating the response surface, in the manner described above.

Lucas County Summary

In summary, the brief answers to the seven questions in our questionnaire for Lucas County are as follows:

1. The state does not provide any rules or guidelines pertaining to the requirement for the separate valuation of land and improvements.
2. There are no state guidelines on valuation techniques, or approaches, except for agricultural use-value assessments.
3. Yes, multiple approaches are used in estimating land values. For residential land, just market data are used. For commercial and industrial properties, benchmarked proxies are used, with top appraisers assigned to do land values.
4. The valuation approach for land has not changed from its market base, but the estimation techniques have changed over the last few valuation cycles, as described above. Although a number approaches are used, as noted, the sales comparison approach drives values for all properties other than improved commercial properties and apartments, for which capitalized income drives value.
5. The models used are described in some detail in two Assessment Journal articles (those cited above).
6. Sales data – assessment-sales ratios, COD, and PRD -- are used to gauge the accuracy of land values.
7. Regarding the separate values for land and improvements:
 - a. Appeals are only on the total value, not the land and buildings components.
 - b. The values are on the Internet and also in the county office.
 - c. Separate values are reported to the state.

Pennsylvania

Pennsylvania is the only state in the U.S. where some local governments currently employ a two-tier local property tax.²¹ According to the information in Table 1, there are 17 municipalities that currently implement a two-tier property tax. Scranton introduced the tax in 1913 and Ebensburg (between Johnstown and Altoona) and Steelton (a suburb of Harrisburg) implemented the two-tier tax in 2000.²² Thirteen of the 17 cities and boroughs with a two-tier tax have adopted the graded tax in the last 20 years.

The property tax in Pennsylvania is almost wholly a local tax. Data from the 2002 Census of Governments show that the state levy of \$50.9 million was just 0.5 percent of the total property tax levy. Among local governments, school districts account for the majority of the tax: 70.3 percent in fiscal 2002. County governments ranked a distant second, with 15.1 percent of the

total, followed by municipalities at 9.1 percent, townships at 4.7 percent, and special districts at 0.3 percent. Local governments in Pennsylvania also levy general sales taxes and individual income taxes. In 2002, the three broad taxes accounted for the following shares of total local taxes in the state: property, 70 percent; sales, 1 percent; and income, 18 percent. Although the income tax is only 26 percent as large as the property tax for Pennsylvania local governments in the aggregate, it is 139 percent of the property tax for municipalities, 109 percent of the property tax for townships, and 11 percent of the property tax for school districts. These figures help explain the very large share of the property tax accounted for by school districts in the state.

Table 1
Cities and Boroughs in Pennsylvania with Two-Tier Property Tax, 1999

City/Borough	Land-to-Building Tax Rate Split	Pct of Revenue from Tax on Land	Population	Adopted Two-Tier Property Tax System
Aliquippa	8-1	75.9	13,374	1988
Allentown	3-1	44.0	103,500	1997
Clairton	10-2	53.0	9,656	1989
Coatesville	5-2	33.9	11,038	1991
Connellsville	11-2	50.1	9,229	1992
DuBois	5-1	43.9	8,286	1991
Duquesne	8-4	30.0	8,845	1985
Ebensburg	3-1	40.0	3,872	2000
Harrisburg	5-1	46.0	52,376	1975
Lock Haven	5-1	61.8	9,230	1991
McKeesport	10-2	59.0	26,016	1980
New Castle	9-2	46.6	28,334	1982
Oil City	9-3	42.5	11,949	1989
Scranton	7-1	65.9	81,805	1913
Steelton	2-1	35.0	5,152	2000
Titusville	6-1	31.0	6,434	1990
Washington	19-1	74.4	15,791	1985

Source: Memorandum: Consideration of Split-Rate (Land Value) Taxation; To Bob Sisson, City Manager, Fairfax City; From Laura L. Sitrin, Director of Finance and Dorothy O. Bennett, CAE, Real Estate Assessor; September 18, 2001.

County governments in Pennsylvania are responsible for property assessments. Because of current controversy with assessed values in Allegheny county, we decided not to include as case study cities or boroughs any cities or boroughs in Allegheny County – e.g., Clairton, Duquesne, and McKeesport. Initially, we selected the city of Washington in Washington County and the Borough of Ebensburg, which is the county seat of Cambria County. The city of Washington is located within the Pittsburgh Metropolitan Statistical Area and, although Ebensburg is a relatively small jurisdiction in a relatively rural area between Johnstown and Altoona, Cambria County is part of the Johnstown Metropolitan Area. Also, the city of Washington has had a two-tier tax for 20 years and has a 19 to 1 tax ratio and Ebensburg is one of the most recent jurisdictions to adopt the two-tier tax in 2000.

In organizing the site visits we called the assessor in Washington County to arrange a meeting to talk about how they determine land value for tax purposes. The assessor indicated that the last

reassessment for the county was in 1981 and that they still use 1981 values. He indicated that land values were determined on a market basis using sales from 1977, 1978 and 1979. He suggested we talk to the private firm that carried out the reassessment in 1981 if we wanted to learn more about how land values were determined.

It turns out that this situation, while not the rule in Pennsylvania, is not that much of an exception, either. There are 67 counties in Pennsylvania. One county – Philadelphia – is undergoing a revaluation now. Eighteen counties have revalued since 2000 and 27 revalued in the 1990s; but there are nine counties that have valuation rolls dating back to the 1980s, another nine counties with valuation rolls dating back to the 1970s and two counties with valuation rolls from the 1960s (Luzerne County, 1965, and Butler County, 1969) and one county with a tax roll dating back to the 1950s (Blair County, 1958). In total, 15 counties – or 22.3 percent of all the counties in Pennsylvania – have tax rolls that are at least 20 years old, including Cambria County (1972).

Various Counties: 21st Century Appraisals

We contacted Dr. Robert S. Barr, the current CEO and President of 21st Century Appraisals, the firm that carried out the reassessment for Washington County in 1981. This firm has activities in nearly one-third of the counties in Pennsylvania. According to an August 2004 study of assessment quality by Dr. Roger H. Downing, eight of the 14 counties in Pennsylvania that met or exceeded the assessment quality standards set by the International Association of Assessing Officers had been reassessed by 21st Century Appraisals. The same study lists 10 counties that met or exceeded IAAO assessment standards for residential property, and 21st Century Appraisals had reassessed nine of the ten. Similarly, 21st Century Appraisals had reassessed five of the six counties that met or exceeded IAAO standards for commercial properties and four of the seven counties that met or exceeded IAAO standards for valuing vacant land [Downing 2004]. Because of this track record by 21st Century Appraisals and the fact that the firm works in a number of Pennsylvania counties, its approach to valuation is clearly of interest.

In doing assessments of improved properties, 21st Century Appraisals starts with total market value and then estimates the value of component parts. They start with a CAMA model that includes characteristics, or attributes, of both the improvements and the land that are thought to influence the value of the property. However, the influence of various attributes on the value of a property varies with the nature or value of the attribute. For example, as the size of a structure increases, the value of incremental square feet may be less than the value of some threshold level. Eckert gives the example of a 1,500 square foot house where each square foot of the residence is valued at \$35.00 [Eckert 1990]. If one envisions the demand curve for living space, with price on the vertical axis and number of square feet on the horizontal axis, at least beyond some number of square feet, the value of additional area declines as the area of the living space increases. Thus, in progressing from 1,500 square feet to 1,600 square feet, the last 100 square feet may command only \$33.00 per square foot, and a further increase to 1,800 square feet might see the value per incremental square foot fall to only \$31.00. Allowing for such nonlinear relationships is one way of attempting to estimate the contribution to value of additional square feet, or other building or land attributes.

More broadly, the principle of contribution says that value is related to effective demand for housing services and utility of property attributes – and the contribution to value may differ significantly from replacement cost. Thus, 21st Century Appraisals builds models to estimate the contribution value of various attributes of land and improvements, which are then plugged into their CAMA model. Because the models are proprietary, we were not provided details. They do, however, reject the general approach of valuing land through the abstraction method, which subtracts the depreciated cost of replacing improvements from total value to obtain an estimate of land value. Their view is that such an approach generally does not produce an accurate estimate of the contribution value of various attributes of the improvements. One example was of a property consisting of several acres of land, a residence, and a barn, with both structures in good condition. Where the market for such properties is for residential use rather than farm use, they argue, the contribution to market value made by the barn generally will be less than the cost of replacing the barn. In such instances, the abstraction method under-values land by putting too high a value on the improvements. However, over-estimates of land value may be more typical. Depreciation tables for structures often reduce a home's value more as it ages than market transactions suggest, and in such instances, abstraction under-values buildings and thus over-values land. Therefore, as an alternative, 21st Century Appraisals constructs models to estimate the contribution value of marginal increments to measures of various individual attributes. These are then included as if/then statements in their CAMA model. It is a multi-stage process, and Dr. Barr emphasizes the importance of judgment in considering the reasonableness of values derived through the various stages.

Ebensburg Borough

Overview. Ebensburg is one of the most recent municipalities in Pennsylvania to adopt a two-tier municipal property tax, which places a higher tax rate on land than improvements. It is located on the eastern edge of an area known as the Laurel Highlands; more precisely, the borough is 19 miles north of Johnstown, 24 miles west of Altoona, 74 miles east of Pittsburgh, and 140 west of Harrisburg, the state capital.

Ebensburg is the county seat of Cambria County Pennsylvania. The city of Johnstown also is in Cambria County, and the county is included in the Johnstown MSA. The county had an estimated population of 148,496 in 2004. This represented a drop of 2.7 percent since 2000 and followed a loss of 6.4 percent during the 1990s. The homeownership rate in the county in 2000 was nearly 75 percent, slightly higher than the Pennsylvania state average of 71 percent. Median household income in the county in 1999 was \$30,179 – about 25 percent below the state average of \$40,106. Ebensburg accounts for just over 3,000 of the county's residents.

The Two-Tier Tax. The borough adopted the two-tier tax in 2000 with a 3 to 1 ratio of land to building taxes.²³ Among the arguments put forward in support of the idea of the two-tier property tax were the following:

- The proposed two-tier tax rate, taxing land higher than buildings, encourages building construction and renovation. The current rate structure, taxing land and buildings at the same rate, heavily taxes new construction and building improvements.

- The proposed two-tier tax rate encourages efficient use of vacant property.
- Statistics from other municipalities utilizing the two-tier rate demonstrate significant increases in building construction.
- Most residences will pay lower taxes under the proposed two-tier property tax because their building/land ratio is higher.
- Nearly all downtown commercial property will pay more because land is valuable. And all vacant land will pay more.
- Overall, the proposed property tax reform will be revenue neutral, resulting in no increase in tax revenues.

The proposal was adopted by the council without any significant opposition. Even the owner of the golf course testified in favor of the change.

Properties in Ebensburg pay property taxes to the county and school district, as well as to the borough, but only the borough has a two-tier tax. We were told that the current borough property tax accounts for about 13 percent of total property taxes levied on properties in the borough. County property taxes account for approximately 28 percent of total property taxes paid by properties in the borough, while school taxes account for about 59 percent of the total.

Table 2 lists eight sample properties that were examined during Ebensburg's debate about the two-tier tax. The sample properties include two residential properties (including the tax commissioner's home), one light manufacturing property, one convenience store, one commercial building, the county fairgrounds, the local golf course, and a vacant lot in downtown Ebensburg.

For the sample properties, total assessed value ranged from \$8,340 for the Carlisle residence to \$248,000 for the commercial building occupied by L. Robert Kimball and Associates. These values are for 1972, the date of the latest reassessment. For the borough as a whole, land was valued at \$3.1 million and buildings were valued at \$12.9 million. On average, the land share of total value was 19.5 percent for the borough as a whole; for the selected properties, it ranged from 5.7 percent for the Contract Screen Printing property to 99.1 percent for the vacant lot at the corner of High and Julian streets in downtown Ebensburg.

In 2000, a uniform property tax of 16 mils on land and 16 mils on buildings would have generated \$255,497 in property tax revenues for the borough. For the sample properties, this translated into property tax liabilities for the borough that ranged from \$133 on the Carlisle residence to \$3,968 on the Kimball and Associates commercial building. Assuming that the borough property tax liability accounted for 13 percent of a property's total property tax liability, total property tax liabilities for the sample properties ranged from \$1,026 on the Carlisle residence to \$30,523 on the Kimball property.

The two-tier property tax column in Table 2 shows what the borough property tax liability would be on each of the sample properties under such a tax with a 30 mils tax on land and a 12.6 mils tax on improvements – the rates (roughly a 2.4 to 1 ratio) adopted by the council for the 2000 tax year. The borough property tax would fall for three properties as a result of a shift to the two-tier tax. The borough portion of total property taxes on Contract Screen Printing would fall by 15 percent; for the Seymour residence the tax would fall by 10.6 percent; and for the Kimball property the borough property tax would fall by 12.5 percent. The fairgrounds would see its borough taxes increase by 15.2 percent; the golf course would see its taxes increase by 58.4 percent,²⁴ and the borough property tax on the vacant lot would increase by 86.6 percent.

Sample Properties	Land Value	Building Value	Total Value	Land as % of Total	Uniform Borough Tax	Total Property Taxes	Two-Tier Property Tax	% Change in Total Property Taxes
Contract Screen Printing	\$5,770	\$94,720	\$100,490	5.7	\$1,608	\$12,368	\$1,367	-2.0
Cambria County Fairgrounds	\$28,180	\$37,830	\$66,010	42.7	\$1,056	\$8,124	\$1,322	3.3
Dr. Seymour Residence	\$4,960	\$45,560	\$50,520	9.8	\$808	\$6,218	\$723	-1.4
Bill Carlisle Residence	\$1,910	\$6,430	\$8,340	22.9	\$133	\$1,026	\$138	0.5
Appledale Golf Course	\$36,800	\$13,420	\$50,220	73.3	\$804	\$6,181	\$1,273	7.6
L. Robert Kimball & Assc.	\$20,000	\$228,000	\$248,000	8.1	\$3,968	\$30,523	\$3,473	-1.6
A Plus MiniMart	\$11,440	\$24,520	\$35,960	31.8	\$575	\$4,426	\$652	1.7
Falchini Lot, High and Julian	\$20,990	180	\$21,170	99.1	\$339	\$2,606	\$632	11.3
Total Borough Taxes	\$3,117,510	\$12,851,030	\$15,968,540	19.5	\$255,497		\$255,448	

While a relatively modest shift to a two-tier tax that taxes land at 2.4 times the rate of improvements would result in some fairly significant borough tax increases for properties with an above average percentage of value in land, it is important to remember that the borough's property tax accounts for only 13 percent of total property taxes on properties in Ebensburg. As a result, the change in total property tax liabilities for individual properties is more modest than suggested by looking at the borough tax in isolation. While the impact on total property taxes is relatively modest for most of the sample properties, we see from the last column in Table 2 that the golf course would experience a 7.6 percent increase in its total property tax liability because

of the increased borough tax, while the vacant lot at the corner of High and Julian streets would experience an 11.3 percent increase in its total property tax liability.

These simulations use the current assessed value of these properties as their basis. Property assessment in Pennsylvania is the responsibility of the county government. In this case, Cambria County is responsible for the valuation of land and improvements in Ebensburg.

Property Assessment. In all of Cambria County there are approximately 92,000 individual parcels that must be valued. The current valuation roll estimates the assessed value of individual properties for the year 1972. Current assessed valuations are based on cost approach for buildings plus market value of land. To estimate the replacement cost of improvements, the Cole-Layer-Trumbull (CLT) 1972 Manual is used, with adjustments for things currently available that were not available in 1972. Land is valued according to market sales in 1972. In urban areas where land sales data are more limited, a land extraction (i.e., abstraction) method is used.

Specifically, in most of the county, land values are based on current market values. Once current market value is determined, the assessed value is calculated by multiplying market value times the State Tax Equalization Board's (STEB) assessment-sales ratio for the jurisdiction where the property is located. The rationale is to try to treat taxpayers equitably by putting all properties on the same-year basis – 1972. However, the STEB ratios are constructed without any screening of sales by the state, thereby undermining their reliability to some extent. Also, with over 30 years since the last revaluation, individual property owners are not treated equally, even if the STEB ratio is applied to all properties, because there is only one STEB ratio for the whole area. However, evidence shows that different use classes actually have different average assessment levels, and even properties in the same class have different assessment-sales ratios. In fact, the coefficient of dispersion for the county is 52.0, which indicates wide variation in sales-assessment ratios across individual properties.

It is estimated that there are approximately 5,220 new deeded parcels added to the property tax roll in the county annually. In addition, there are approximately 12,550 changes to property record cards annually. Finally, there are about 350 to 400 appeals annually. Most of the appeals come from commercial and industrial property, for which the current income approach to valuation yields values substantially below the market values implied by the current 1972-based assessed values.

The taxpayer can appeal only total value of property, not on the basis of the split between land and buildings. This is a state provision, and it holds even in Ebensburg and other places where the tax liability depends on the land-buildings split.

Because the CLT manual uses only the cost approach to valuing improvements, that is the only approach now used by Cambria County for determining assessed value. However, when a taxpayer appeals, a fee appraisal generally is part of the evidence in support of the appeal, and those appraisals typically include income and/or market value evidence (most appeals are commercial, so income generally is used). At this point, the chief assessor has to deal with the other approaches in some fashion. In fact, there is a state requirement that three sorts of

evidence should be considered in setting assessed values: cost, market data, and income. Technically, many counties in the state, including Cambria County, are not meeting this requirement.

All property record cards are paper. No data have been computerized, except address and total assessed value, and that computerized information cannot be accessed by citizens or others outside of the government, except by coming to the assessor's office and having a staff member call up the data. This will change after the impending revaluation, with much more information computerized and available on a website. Also, assessment records will be tied into GIS.

Currently, the assessment staff does not know the exact breakdown of parcels into the commercial/industrial, residential, vacant, and other use classes. The office is about to enter into a contract with a private firm that will update all parcel information, as a prelude to revaluation. The current target is to have new assessed values by 2009 at a cost of about \$40 to \$45 per parcel. The state has put up \$1.3 million for the effort, which is believed to be a record high amount of state money for such activity in Pennsylvania.

Summary. In summary, the brief answers to the seven questions in our questionnaire for Ebensburg-Cambria County are as follows:

1. The state does not provide any rules or guidelines pertaining to the requirement for the separate valuation of land and improvements.
2. There are no state guidelines on valuation techniques, or approaches, except for agricultural use-value assessments.
3. Land in Cambria County generally is valued on the basis of market data, although abstraction may be used in cities and boroughs where there are few land sales. Also, multiple unit measures are used in estimating land values – e.g. square foot values are calculated in cities, front foot values are calculated for homogeneous lots with uniform depth, lot values are used without any adjustments, and acreage is used for agriculture land.
4. There has been no change in the approach to valuing land.
5. There is no documentation of the valuation models or approaches that can be shared.
6. No, there is no means of evaluating the accuracy of land values.
7. Regarding the separate values for land and improvements:
 - a. Appeals are only on the total value, not the land and buildings components.
 - b. The values currently are available only in the county office, although the impending reassessment will include placing values on the Internet.
 - c. Separate values are not reported to the state.

Harrisburg

Overview. Harrisburg, the capital of Pennsylvania, lies within Dauphin County in the southeastern part of the state, about 110 miles west of Philadelphia. At the time of the 2000 census, Harrisburg's 48,950 residents accounted for nearly one-fifth of the 251,798 people living in Dauphin County. Differences between county and city, however, are large. Harrisburg occupies only eight square miles of land, giving it a population density of 6,036 per square mile,

compared to 479 per square mile for the whole of Dauphin County. Also, between 1990 and 2000, Harrisburg's population declined by 5.8 percent while countywide the population rose by 5.9 percent. Median household income for the county in 1999 was \$41,507, but the figure for Harrisburg was only \$26,920, not quite two-thirds of the countywide level. Consistent with the income differences, the median home value in 2000 was \$99,900 for Dauphin County as a whole, but just \$56,900 for Harrisburg. Homeownership rates also differ, standing at 65.4 percent for the whole of Dauphin County but only 42.3 for Harrisburg. Countywide, 77.1 percent of the population in 2000 was white and 14.2 percent was at least 65 years old, compared to 31.7 percent white and 10.9 percent aged 65 and older for Harrisburg. For comparison, statewide figures for Pennsylvania are as follows: population density, 274 people per square mile; 1990-2000 population change, plus 3.4 percent; median household income, \$40,106; median home value, \$97,000; homeownership rate, 71.3 percent; portion of the population that is white, 85.4 percent; and portion of the population that is at least 65 years old, 15.6 percent.

Property Assessment. Assessment is a county function in Pennsylvania, so Harrisburg is assessed by Dauphin County. We met with Steven L. Howe, Director of the Dauphin County Offices of Tax Assessment and Tax Claim, in his Harrisburg office. Within the county, both Harrisburg and Steelton use the two-tier tax, placing a higher rate on land than on improvements. Even so, we were told that Dauphin County (indeed, the state) does not allow appeals based on the separate valuations for land and improvements; rather, the whole parcel value must be the basis for an appeal. Harrisburg and Steelton are just two of about 40 municipalities in the county. The county's 525 square-mile area is divided by Blue Mountain; north of the mountain is rural, and the southern portion is urban and richer. Still, there is a good deal of variation even within the southern portion of the county. For example, the highest land values in the county are in Hershey, where a half-acre to one acre lot reportedly sells for \$80,000 to \$125,000, well above values in Harrisburg, even though both are in the southern portion of the county and just a few miles apart.

Dauphin County, which has between 107,000 and 108,000 parcels of real property, is divided into about 450 neighborhoods; 15 areas within Harrisburg are identified. Unlike Cambria County, Dauphin County abandoned basic reliance on cost-based assessments at the time of the last reappraisal, in 1982. Since then, it has valued on the basis of market values. In valuing land, a number of approaches are utilized: analysis of actual vacant land sales, abstraction, capitalized land rents, and allocation. Because the intent is to estimate market values, preference is in the order of this listing – use of actual vacant land sales where possible, followed by the other three approaches; abstraction is the basic approach used in areas where there no longer are enough valid sales of vacant land. One problem with allocation is that the land percentage of value varies considerably; in some old areas about ready for redevelopment, 80 percent to 90 percent of total parcel value may be land value, while a figure closer to 20 percent is about average. Based on 2004 values, land represents 19.3 percent of Harrisburg's \$3 billion total land and improvements value.

Harrisburg, together with other cities and large boroughs, is among the areas where abstraction is the primary method for estimating land values. In Harrisburg, there may be no arm's-length, bona fide sales of land. Some of the reasons for this include city constraints on land use, such as affordable housing requirements and "anchor" neighborhood status to try to stop decline.

Dauphin County has no general rule as to the use of either total lot value or value per such units as front-foot and square foot. In Harrisburg, however, value per front-foot often is used. Reasons given for this include the prevalence of town houses and row houses that are on very narrow lots of rather uniform depth. For commercial properties, however, value per square foot may be considered because total lot size is more important for such properties. In the townships, which are unincorporated areas, important values are those per acre and per building site. In developing areas, a complicating factor is that different developers use different approaches in pricing land. Some price by the lot, others by the square foot, and builders' sales prices are part of the information base. To meet the state requirement of uniform assessment according to market value, the assessor has to consider a variety of measures.

Howe noted that utilities and other improvements aside from buildings are reflected in land values in the separate valuation of land and buildings, to the extent that the improvements exist or are feasible in the near term. He considers these not to be pure land values, which would capture only the value of raw land. Thus, Dauphin County land values approximate site values – values of land developed and ready for building. These values include the estimated market value of public water and sewer connections, or the value of the alternatives, wells and septic systems. Land in rural areas not served by public water is therefore worth less if there is no water that can be tapped by drilling a well; similarly, land not on a public sewer line is worth less if soil percolation is not sufficient for a septic system. One implication is that a sewer moratorium decreases value, which then rises when sewer capacity is increased and service can be extended.

Property Tax Rates. Although property tax assessment is centralized at the county level, tax collection is not. The various taxing authorities send their own property tax bills; there is no consolidated bill. Inside the city, the cumulative effective property tax rate is estimated to be in the range of 3.25 percent to 3.75 percent, and outside the city the range is from 2.0 percent to 2.25 percent. Schools account for the largest part of the total property tax in all areas.

Under the city's two-tier tax, land is taxed at 24.414 mils, or 2.4414 percent, and land is taxed at 0.4069 percent; thus, the current land rate is six times that applicable to buildings. Still, when the tax rates of other, overlying jurisdictions are added in, the total land rate is 5.287 percent and the total improvements rate is 3.525 percent. Thus, the city's 6:1 differential is reduced to just a 1.5:1 differential, as perceived by taxpayers considering their total property tax obligations. Because none of the taxing units overlying Harrisburg uses a two-tier tax, the entire differential is due to the city's tax. If the city levied a single rate on land and improvements, that rate (using 2004 assessed values) would have to be 0.8006 percent to yield the same revenue, and the single-rate cumulative tax rate for properties located within the city would be 3.646 percent.

Although analysis of the effects of the two-tier tax is beyond the scope of our current inquiry, we nonetheless drew a sample of 110 property parcels from the 15 geographic areas within the city, using the data available on the Internet.²⁵ The number from each area ranges from five to 10. Most parcels are residential, but other use types also are included. One impression that emerged from the exercise is that Harrisburg is an old city. Of the 110 properties, 93 had improvements and seven were vacant (including parking lots). Of the 93 improved properties, 37 (32.7 percent)

were built in 1900 or before, and only 25 (22.1 percent) were built after World War II. The sample was not drawn to be representative by age of structure, but the preponderance of all buildings reviewed on line (which was a number greater than those in the sample) were built before World War II.

The two-tier tax results in a higher tax than a uniform tax for 109 of the 110 properties. The one property in the sample with a lower tax as a result of the two-tier tax is an industrial property with structures valued at \$87,200 and land at \$2,900; with land equal to only 3.2 percent of the total valuation, this property is atypical. For properties with a higher tax under the two-tier tax, the increase ranges from 0.9 percent to 45 percent. The latter figure applies to each of the seven properties with zero building values. Thus, the two-tier tax – even though employed only by the city, and even though the city levy amounts to just 22 percent of the total taxes imposed on real properties within the city – causes the tax burden on vacant land to be 45 percent higher than it would be under a uniform tax.

A further differential between land and improvements exists for some properties, and it is not reflected in the calculations for the sample of 110 properties. Specifically, under the state's Local Economic Rehabilitation Tax Assistance Act (LERTA, 72PS-4722), building values for certain properties are phased onto the tax roll rather than being fully taxed immediately, while land is fully taxed. Localities have some choice as to the when building values are brought onto the tax roll. One option is full exclusion for three years, followed by full taxation beginning in the fourth year; others include a phase-in of building values over a five- or ten-year period. In addition to the two-tier taxes, this is another reason why the separate values for land and improvements are important.

Appeals. As already noted, assessments in Pennsylvania cannot be appealed on the basis of the separate valuations of land and improvements. This seems strange, given the tax consequences of the split in the several municipalities that opt for two-tier tax systems, including Harrisburg and Steelton in Dauphin County; moreover, the difference is important under LERTA in other areas. We have argued elsewhere that pressure for appeals on the two components separately should be expected if tax liabilities depended upon the breakdown between land and improvements [Bowman and Bell 2004], yet such appeals are not allowed in Pennsylvania after nearly a century of the two-tier tax option.

If the common level of assessment (i.e., the aggregate assessment-sales ratio) calculated by the State Tax Equalization Board (STEB) is under 85 percent, then the STEB ratio is used in appeals to determine whether there is over-assessment. The latest STEB ratio for Dauphin County is 80.4 percent, so the STEB ratio is used in appeals. The county is critical of the STEB ratio (as others are) because it is not stratified by property type.

Summary. In summary, the brief answers to the seven questions in our questionnaire (above) for Harrisburg-Dauphin County are as follows:

1. The state does not provide any rules or guidelines pertaining to the requirement for the separate valuation of land and improvements.

2. There are no state guidelines on valuation techniques, or approaches, except for agricultural use-value assessments.
3. Yes, multiple approaches are used in estimating land values; market values generally are used, but in the cities and larger boroughs, abstraction is used.
4. The valuation approach changed from cost-based to market-value-based with the 1982 reassessment.
5. There is no documentation of the valuation models or approaches that can be shared.
6. Abstraction is used to gauge the accuracy of land values in the cities and large boroughs; in other areas, land sales data are used.
7. Regarding the separate values for land and improvements:
 - a. Appeals are only on the total value, not the land and buildings components.
 - b. The values are on the Internet and also in the county office. For a monthly fee, users can obtain, via the Internet, all sales data and property characteristics.
 - c. Separate values are not reported to the state.

Virginia

Property taxation in Virginia includes both real and personal property taxes, and the base of the latter differs across localities due to local option provisions. Based on Census Bureau data for fiscal 2002, nearly 97 percent of all property tax revenue in Virginia represents local government taxes. State data for 2004 show that real property taxes account for 79 percent of total local property taxes, and taxes on utilities ("public service corporations") account for another 3.8 percent; this category includes both real and personal property [Virginia Auditor of Public Accounts 2005, Exhibit B]. The various categories of personal property collectively make up the remaining 17.2 percent of local property taxes. Thus, we see that real property taxes account for the bulk of all local property taxes. These taxes are levied by three types of local government units: counties, cities, and towns. Their respective shares of total property taxes are 70.1 percent, 29.1 percent, and 0.8 percent; counties account for a similarly large share of just the real property tax, 67.0 percent. Virginia has no independent school districts and no townships. Cities are independent of counties – that is, cities do not overlie counties – but towns are incorporated areas within counties. There are 95 counties and 39 cities, and together they cover the whole of the state. All counties and independent cities levy the optional 1 percent local sales tax that is piggybacked on the state tax, but there is no local income tax. One reason for the dominance of counties is that the state's largest locality, Fairfax County, accounts for nearly 14 percent of the state's population, and – being a part of the high-income Washington suburbs – an even larger percentage of its income and property values.

Each of the counties and independent cities is a primary assessing jurisdiction in Virginia, and a unit of the state's Department of Taxation provides oversight and compiles the annual assessment-sales ratio study. Some localities have an in-house appraisal staff, while others engage private appraisal firms. Those with in-house staffs generally are the larger localities, but some smaller units also have their own appraisal staffs. In Virginia, localities also have the option of adopting certain real property tax relief programs [Knapp and Culp 2005, Section 3], and they have some latitude in setting reappraisal frequency. State law differentiates by type of government and by population size. In general, cities must reassess every two years and counties

every four years; however, state law allows cities with no more than 30,000 residents to opt for a four-year reassessment cycle, while counties with no more than 50,000 to opt for a six-year cycle and any unit can choose to reassess more often than required [Knapp and Culp 2005, Section 2, p. 2.] The latest state assessment-sales ratio study report shows that as of 2003, 11 of 95 counties and 17 of 39 cities had opted for annual reassessment [Virginia Department of Taxation 2005, pp. 9-11].

We did case studies in three Virginia localities that do their own appraisals. This eliminated the possible difficulty, encountered in Ohio, of not being able to get the time of private appraisers to assist in this study. The three study areas are Fairfax County, the city of Roanoke, and Goochland County. They provide diversity as to population size and property mix.

Fairfax County

Overview. Fairfax County²⁶ lies just beyond Washington, DC. It is Virginia's largest locality, in terms of population. At the time of the 2000 census, Fairfax County was home to 969,749 people; this reflected an increase of 18.5 percent between 1990 and 2000, and the county population is estimated to have grown another 3.4 percent – to over 1 million – by July 1, 2004. The 2004 figure represents 13.4 percent of the state's 7.5 million residents. Fairfax County occupies 395 square miles, giving it an average population density of 2,455 people per square mile in 2000. The county's homeownership rate is slightly above the state average, at 70.9 percent. Median home value is well above the state average (\$233,300 versus \$125,400), as is median household income (\$81,050 versus \$46,677). There were 533,482 private, non-farm jobs in the county in 2001; this represented an increase of 4.8 percent over 2000, and was equal to over 97 percent of the county's 2000 resident workforce. Because of both the county's large employment base and the high real estate values in the Northern Virginia area, Fairfax County accounts for a share of statewide taxable assessed value (26.6 percent) that is roughly double its share of the population [Knapp 2005]. Despite the large number of private jobs in the county, single-family residential properties represent 79.2 percent of total taxable value in Fairfax County, compared to an estimated 71 percent statewide; multi-family housing brings the county's housing share to 82.5 percent. Vacant and agricultural land accounts for 0.1 percent of total value, and the remaining 17.4 percent is accounted for by commercial and industrial properties [Knapp 2005].

Property Tax Assessment – Current Practice. As noted, Fairfax and the other two Virginia study areas all have in-house appraisal staffs, and Fairfax County is one of the jurisdictions opting for annual reassessment. Property assessment is the responsibility of the Real Estate Division, which is a part of the county's Department of Tax Administration. We met with Janet E. Coldsmith, Director of the Real Estate Division, Don A. Deal, Assistant Director, and some other members of the staff to discuss land valuation in Fairfax County. Although the county's general approach to estimating property values has not changed, there have been some changes in the mechanics of implementing that approach. In fact, the county currently is revising its assessment system. Our impression, stated simply, is that the county is moving from a cost-based assessment system to one that is at least approaching a contribution value system. Also, it is adjusting to a declining number of vacant land sales or, as they put it, to losing the luxury of adequate land sales.

In valuing land, different approaches are used for different use classes. The number of real estate parcels in the county is approaching 400,000. As noted above, single-family residential properties account for the vast majority of Fairfax County taxable value. The county's Real Estate Division staff provided us with the following written summary of how it determines land values for single-family residential parcels:

"The Fairfax County Department of Tax Administration, Real Estate Division utilizes a standardized land assessment methodology in the more homogeneous single family neighborhoods. This can be summarized as follows:

- "Fairfax County is divided into market areas where similar value influences are present for all properties within each market area.
- "Similar properties within each market area are grouped into assessment neighborhoods. These neighborhoods are also assembled into neighborhood groups containing similar assessment neighborhoods.
- "Assessment neighborhoods are examined for recent land sales. In most cases, the more homogeneous neighborhoods are built out, resulting in no recent land sales. In these instances, available land sales in similarly priced neighborhoods are reviewed to determine typical land to total price ratios.
- "The typical price level for improved properties (house and land) is determined for each assessment neighborhood.
- "Within each price level, land assessments are assigned using 10,000 square feet as a base lot size. Adjustments for lot sizes above and below the base size are typically made at \$0.50 per square foot (unusual cases such as high value neighborhoods may vary). The resulting land assessment is rounded to the nearest \$1,000. It should be noted that this methodology is applied to lots that will yield only one building site.

"The above land assessment process recognizes that many buildable lots in more homogeneous neighborhoods are typically fairly close in value, but that uniform, gradual value changes more smoothly recognize incremental changes in lot sizes. This practice is similar to that used for improvements, where a change in value is made between two otherwise identical houses when one is slightly larger or smaller than the other. In addition, research revealed that several nearby jurisdictions such as Alexandria, Loudoun, and Prince William are using the same basic methodology."

The use of land sales information from one geographic area to gain insight into land values in other areas where there are few or no vacant land sales, noted in this summary, is a practice encountered in some localities. Such a practice cannot successfully be automated and divorced from application of judgment by the appraisers.

In the course of discussing of this system, it was noted that 10 market areas have been defined. Before recent changes, the process used to be centered on individual neighborhoods, and an appraiser worked with a certain geographic area, which was a small part of a market area. It was not possible to gain an overview of all changes to assure consistency across areas. The new system, the CLT Integrated Assessment System (IAS), is computerized and makes oversight and coordination easier. Residential land values are generated using a computer-assisted land pricing (CALP) model. It was noted that the use of a base lot size with a very small adjustment per square foot for departures from base size, as applied by this system, has the advantage of being easier to explain to taxpayers than use of a site value with no adjustment for such differences.

Although there are fewer sales of commercial land in Fairfax, the county nonetheless has enough such sales to work from sales data. Still, there are important differences between commercial and residential valuation techniques. Appraisers consider properties with similar use potential. Value is related to different measurements for different use classes: value per square foot, value per unit, flat value per parcel, and value based on the floor area ratio (FAR). As examples, value per square foot is important for commercial/office properties, the number of units (rooms) that can be built is important for hotel properties; a flat value per parcel might be used for fast food restaurant properties, and FAR is useful for still other property types. A model is developed for each neighborhood, by use class. As in any market analysis, the whole market has to be considered; that is, more than one or two sales are needed. For commercial property sales analysis, it often is necessary to use sales from a longer time period than is used for the more numerous residential sales.

A major approach to estimating the value of commercial properties is the income approach. Cost data also are used; big differences in values based on the income and the cost approaches may indicate bad land values, and thus need to be reconciled. In general, though, income and expense data are used to arrive at total property value, and the value for improvements is gotten by subtracting land value from total value (the reverse of the usual abstraction approach). A problem is that old improvements may imply under-use, and the model may generate a market value that is less than the land value. In such cases, the market values have to be adjusted. A property's use *potential* is considered because state law requires market values, not current-use values. Thus, unused development potential results in an addition to the model-generated estimate of total value.

A similar problem is encountered in estimating land values in residential areas when in-fill development starts to change the character of the neighborhood. In several parts of Fairfax County, homes built several decades ago that still are quite good are being bought, torn down, and replaced with new homes that are larger and incorporate many features not found in the older homes. Beyond some point, as the number of such tear-down/rebuild cases increases, neighborhood land values rise and need to be adjusted. This was described as a tricky business. The number of such cases must be large to support increasing land values to current market levels. And in such areas, when appraisers have increased the land values, they cannot add the replacement cost of an existing older structure to the new land value, for this would produce too high a total parcel value; such properties tend to be bought to tear down the existing structure, so replacement cost is not an appropriate consideration.

Property Tax Assessment – Old and New Systems. As noted, Fairfax County is in the process of developing and implementing new valuation mechanics. The old system was characterized as cost-based, with trending of sales data and analysis of sales prices using multiple regression analysis. The new approach, employing the CLT-ISA software, will be market-based, rather than cost-based. The computer-assisted land pricing (CALP) model will generate land values, drawing on available data from land sales. Cost data will be used to estimate the value of improvements, but in the new system, multiple regression analysis (MRA) will be used as a separate valuation tool; in the past, MRA was used as a check on the total parcel values obtained from adding market value of land and replacement value of structures. Under the new system, MRA will be used to adjust improvements values to reflect the influences of property attributes. Land values from CALP will be assigned, similar to the Lucas County approach; thus, land values are determined in the same way under the cost-based approach and the new MRA approach.

So far, Fairfax has applied MRA in valuing townhouses and condominiums. The results are encouraging, as values developed by the system have reduced the coefficient of dispersion (COD) by one percentage-point. This may not sound like a lot, but the drop is nearly 15 percent – i.e., from a COD of about seven to one between five and six. MRA will be applied to single-family residential properties in the next one to two years.

Whatever basic approach is used in valuing properties, a parcel-by-parcel review of computer-generated values for land and for improvements was said to be needed. The CLT-ISA software fine-tunes values based on improvement characteristics using neighborhood calibration, and the MRA market model will identify the top five comparables for a given property, facilitating evaluation of the estimates by appraisers. Any computer-generated values need to be reviewed for reasonableness, and informed judgment often must be applied to adjust a model's value estimates. This applies to the separate land and improvements values. In the case of land values, some of the things that need to be considered are high traffic volume and noise, power line easements, lot configuration, and topography. Under the new system, once an adjustment has been made, CALP can apply the adjustment factor year after year. For example, if the land value of a parcel is reduced by 10 percent because it backs up to the beltway, each new value estimate can be reduced by 10 percent. It would seem that judgment still will need to be exercised, to determine whether 10 percent remains the appropriate adjustment as markets change over time.

Summary. In summary, the brief answers to the seven questions in our questionnaire for Fairfax County are as follows:

1. No specific state guidelines or requirements as to valuation methodology.
2. There are no specific state guidelines on valuation techniques, or approaches.
3. Yes, multiple approaches are used in estimating land values; in particular, there are differences between the relatively homogeneous residential lots and the more heterogeneous larger tracts.
4. The market-based valuation approach has not changed, but the mechanics of implementing that approach have.
5. There is no documentation of the valuation models or approaches that can be shared.

6. Assessment-sales ratio data are used to gauge the accuracy of land valuations, but the primary ratio information is for improved properties.
7. Regarding the separate values for land and improvements:
 - a. Appeals can be on any basis.
 - b. Information is available to the public in the tax books, and on line.
 - c. Yes – aggregate and individual-parcel values, separated into land and improvements components, are reported to the state.

City of Roanoke

Overview. Roanoke is an independent city²⁷ in the Blue Ridge Mountains in the southwestern part of the state, served by Interstate 81 and U.S. 460. Its 2000 population was 94,911; it experienced a 1.6 percent population loss during the 1990s, and is estimated to have lost another 2.2 percent by July 1, 2004. The city occupies 43 square miles, giving it an average population density of 2,213 people per square mile in 2000. The Roanoke homeownership rate is rather low, at 56.3 percent, as is the \$80,300 median home value. Similarly, median household income, at \$30,719, is well below the state average of \$46,677. On the other hand, the city is an employment center. There were 81,382 private non-farm jobs in 2001, which is high compared to population; moreover, census data indicate that the job count grew by 8 percent between 2000 and 2001.

Property Assessment. Roanoke is one of the 17 independent cities that have adopted annual reassessment, rather than the permissible two-year cycle. Property assessment is performed by the city's Office of Real Estate Valuation, which is housed within the Department of Finance. We met with the Director of Real Estate Valuation, Susan S. Lower, and several members of her staff to discuss the city's methods of valuing land for tax purposes.

Several changes have been made to the city's assessment system over the past few years, and the changes are not quite complete. New valuation software (ProVal) has been adopted to replace the CAMA system that had been in use for 28 years. Appraisers have walked the streets of the city to verify and update information on the property record cards, new pictures have been taken of each parcel, and new computer-generated sketches have been developed. The result is a substantial improvement in the ability to generate reliable estimates of value. Not only have both the database and the valuation software been improved, but the new software also allows much more analysis than was possible before; this, too, is helpful in improving value estimates. For example, reports can be generated that focus on outliers, recent market sales, and other sets of properties of particular interest.

Roanoke is old and rather densely settled, so there are few sales of vacant land within the city. To generate the required separate values for land and improvements, the city relies primarily upon the abstraction approach. It was noted that even when there is a sale of a vacant lot in the city, the sales price may not be a good indication of market value. Because there are so few vacant lots available, those that remain in desirable areas tend to command a premium. Evidence of an (average) market value requires many observations, and when there are very few – and maybe only one – the information has to be used with care. For example, the last lot recently sold in one desirable neighborhood, and while it sold for less than what most other lots in the

neighborhood had commanded, the assessors argued the price paid was a premium price. They noted that the last lots sold tend to sell last because they are less desirable. In this case, the topography was unfavorable – there is a steep slope that limits building possibilities. Using data that take into account such things as topography (and sales of lots in similar areas of Roanoke County), the conclusion was that the price paid was an outlier on the high side; thus, it did not provide information that reasonably could be used to adjust other lot values upward. To augment available city data and to provide a check on the land values derived by abstraction, Roanoke assessors often consider sales from other local jurisdictions, chiefly adjacent Roanoke County. In this, and other aspects of appraisal, judgment must be used in selecting comparison properties and in using the information, because no two properties are exactly comparable.

Because the abstraction approach calculates land value by subtracting building value from total parcel value, accurate land values depend upon accurate building values. The ProVal CAMA software uses cost data based upon Marshall-Swift information, but not Marshall-Swift data per se. These data have been tested by Roanoke in a recent residential development, using data obtained from the developer. (It was noted that this new development did not provide direct evidence on the market value of land, because the developer built on each lot and sold the improved parcels.) The buildings were new enough that depreciation was not an issue. The CAMA model performed well for this area. Comparisons also were made with recent construction in adjacent Roanoke County. The city's staff then started to develop estimates for other parts of the city, and is satisfied that the new ProVal CAMA system is working well. After the software generates total parcel values, depreciated replacement costs are subtracted to arrive at estimated land values.

The importance of judgment already has been noted. The increased analytic capability provided by the new CAMA system improves the information available to inform the assessors' judgment. Thus, it helps to assure the accuracy of individual parcel valuations. Highlighting various aspects of property value or value change can help the staff to understand the numbers better, and it can lead to catching errors. For example, in applying the new CAMA system to one residential neighborhood, a report was generated focusing on changes in land value, changes in building value, and changes in total value. Some properties with decreased building values were found to have had dormer areas of the upper level omitted, so costs were understated. Analysis caught this error before the estimates were certified. Analysis can also highlight outliers in the distribution of parcels by the land share of total value.

The land share of total parcel value (land allocation method) is considered in Roanoke, and the land share generally is in the 20 percent to 25 percent range. This differs across neighborhoods, though, and sometimes within a neighborhood, so this cannot be the primary method of arriving at land value. For example, within a neighborhood, individual homes of quite different sizes and values are built on lots of similar value, resulting in different land-building (L/B) ratios. In older neighborhoods, some buildings have been maintained better than others, which is another source of differences in L/B ratios. If one thinks in terms of a reasonably constant land percentage of total parcel value within an area – the starting point, at least, for the allocation approach – the differing L/B ratios look odd, but they often can be justified. Whatever primary approach is used to generate land values, good judgment is essential to deriving accurate estimates for individual parcels.

At this point, there is no systematic analysis to try to convert land values to unit measures, such as front-feet or square feet, but that will be a possibility with the new system. For residential properties, though, Roanoke typically uses site (or lot) values, without regard to the front-footage, depth, or total area. Small differences in these values don't seem to affect prices paid for lots, so these aspects are not primary routes to estimating value. However, considering drainage, topography, etc., can help in arriving at more reasonable values for some properties. Although Roanoke is an old city, and is mostly built-up, it still has a number of residential parcels consisting of several acres each. These are treated as a home site with residual land, and the residual land (all but an acre or so) has a lesser value per acre; as the number of acres increases, the value per acre decreases. This is backed by evidence from areas outside Roanoke city.²⁸

This underscores the fact that different approaches to valuing land are used for different use classes. Residential is primarily based on site value, rather than some other unit value. Value per square foot often is the basis for commercial land valuation, and front-footage is often important for industrial land.

The changes to the Roanoke assessment process are not yet complete. The staff is developing a different valuation model for each area of the city. This comment was made in connection with the fact that lot sizes vary considerably – inner-city building lots often are quite small, and some old ones are only 25 feet wide. Staff expects the land share of total value in such areas to be only 15%, and maybe only 10%, of total parcel value. If the improvements are not in good shape, though, the land share could be higher, despite the small lot sizes. We are not clear on just what constitutes a separate model, and at this time there is no documentation that can be shared. Staff is developing a new procedures manual, but it will not be ready for several more months.

As the new method is applied to residential neighborhoods, it is becoming clear that land value shares are going to rise in many cases, and by more than the percentage change in structures. This will increase the overall land share. (Prime reliance on allocation would not lead to the appropriate changes in such cases.) In one neighborhood, for example, the current certified average land value is \$18,000; this is both the median and the mode, and the mean is very close. The new cost data and updated property records, coupled with sales data for improved lots, indicate that the average lot value really is about \$31,000. While improved-parcel values in this area are higher than those on the books now, the total value increase is nothing close to this 72% increase for land value. We asked if there was any reluctance to go with such changes, because in another meeting for this study, it was suggested that land values often are understated because higher land values mean lower building values, and “people don't like to see their home values drop” or even rise very slowly. Roanoke assessors said this is not a problem; they intend to certify the values that seem most defensible. However, to the extent that aversion to posting land value increases as high as indicated by market data is present in some places, one would expect greater land-value errors where land is increasingly scarce and its price is being bid up more rapidly.

We asked whether there is a way of monitoring, or verifying, the accuracy of land value estimates. The Roanoke staff views the abstraction process as providing a test on accuracy,

given that it is used in conjunction with updated property records and cost data, and buttressed by cost information and sales data from some other jurisdictions. This may be another instance where assessor judgment is critically important. Simply using the abstraction process to test the accuracy of land values generated by that same process clearly is circular, reminiscent of what one valuer in a South African city that also had very few land sales told us a few years back. When a taxpayer asks for evidence that the land value is correct, he said, you just run the model again, show the taxpayer that you just got the same value as before, and thus "prove" that the value is correct. (This is part of the situation he characterized as "an Alice in Wonderland experience.") Where greater clarity can be gained in the Roanoke setting is through use of sales data from other localities, adapted to Roanoke with good judgment. Also, the updated property records, noted earlier, clearly are critically important to getting reasonable estimates of land values.

Roanoke assessment records are linked to the geographic information system (GIS), which enables generation of assessment-sales ratio data by area, to get a visual image of where assessments are most in need of improvement. While building permits are not currently linked to the assessment records, they will be very shortly, making this another part of the improved information available to support property assessment.

Summary. In summary, the brief answers to the seven questions in our questionnaire for city of Roanoke are given below. The seventh question was discussed only briefly, and is not covered in the preceding paragraphs.

1. There are no specific state guidelines or requirements as to valuation methodology.
2. There are no specific state guidelines on valuation techniques, or approaches.
3. Yes, multiple approaches are used to estimate land values; land abstraction is the primary approach, and various unit measures are used for different land uses.
4. The basic approach to valuing land has not changed. However, better data are being assembled and new CAMA software has been adopted; these will enable the abstraction method to yield better, more defensible results, as discussed above
5. At this point, there is no written documentation that can be shared. A new procedures manual is being developed but it is about a year away from completion.
6. The Roanoke assessment staff views the abstraction process – in conjunction with updated city records and cost data and reference to sales data in other jurisdictions – as providing good evidence on the accuracy of the values their estimated land values.
7. Regarding the separate values for land and improvements:
 - a. Appeals can be on any basis.
 - b. Information is available to the public in the tax books, and on line.
 - c. Yes – aggregate and individual-parcel values, separated into land and improvements components, are reported to the state.

Goochland County

Overview. Goochland County is in the second tier of counties northwest of Richmond, the state's capital. At the time of the 2000 census, Goochland had a population of 16,863 and a population density of just 59.3 per square mile. The county is developing rather rapidly; it

experienced 19.1 percent population growth between 1990 and 2000 and is estimated to have grown another 11.2 percent by July 1, 2004. The homeownership rate in Goochland is high, at 86.6 percent, and the median home value of \$149,800 is also relatively high; state averages are, respectively, 68.1 percent and \$125,400. Goochland's \$56,307 median household income also is well above the state average of \$46,677. The county is a rural area that is urbanizing, a developing bedroom community, with 3,436 private non-farm jobs.

Property Assessment. Perhaps reflecting its growth and expected future development, Goochland County recently created its own real estate assessment staff. It is headed by Glenn E. Branham, who previously was the assessor in the city of Charlottesville, Virginia; he has been in Goochland nearly three years, after 15 years in Charlottesville. Previously, assessments were made by private contract appraisal firms. The county has been on a four-year reassessment cycle, with the latest reassessments being for 2001 and 2005. New values will be prepared for 2007, however, effecting a change to a two-year cycle. Starting in August of 2005, property values are accessible through the county's website, where the 2005 values now are posted.²⁹

Goochland's CAMA system is characterized as quite old, and a request for proposals to develop a new system was being prepared at the time of our July 2005 meeting. As a result, there is no current statistical model used to generate land values. Considerable development is occurring in Goochland, and developers are asked how lots are priced. If their pricing methods seem reasonable, those numbers are used. For older parcels, comparable neighborhoods are used in estimating land values. A number of factors are considered, such as lot size, configuration, and view. Tables are developed to determine multipliers that are applied to various measures of property size in different parts of the county. Because there are many sales of vacant land, land sales are tracked, and assessment-sales ratios are computed for land, as well as for improved properties. Analysis of those ratio studies indicates when changes to the tables are needed.

In short, analysis of market data on land sales is the primary approach to generating land values in Goochland County. In general, residential lots in a given area are valued at so much per site, rather than precise measurements of the individual parcels, such as the foot-frontage or number of square feet. Really large lots are valued by the acre, with the first acre being given a higher value than additional increments to size; market data support this. For improvements, Marshall-Swift cost information is used as a guide, but the data are adapted to the locality by talking with area builders. Marshall-Swift local area multipliers are not used.

Because of his long experience in Charlottesville, Mr. Branham drew several contrasts between that city and Goochland County. Charlottesville in 2000 occupied 10 square miles and averaged nearly 4,400 people per square mile. A major presence is the University of Virginia. By contrast, Goochland County comprises 284 square miles, with a 2000 population density of 59.3 people per square mile. While Goochland is still largely rural it is developing rapidly and has many sales of vacant land. Charlottesville, on the other hand, was said to be 98 percent built out, with few sales of vacant land. Moreover, the few sales of vacant land that do occur there tend not to be useful, because they are not believed to be true market values. Specifically, they tend to be sales of the last one or two lots in a given development. It is believed such lots command a premium price because they represent a nearly-vanished opportunity to buy into a desirable neighborhood. While the sales are market sales, there are too few of them to represent a

"market" in a meaningful sense; only a small number of people are making these purchases, and they tend to be viewed as outliers. Thus, the prices they pay are not believed to provide a sound basis for adjusting the land values of other properties. As a result, Charlottesville can make little, if any, use of comparable land sales to estimate land values. Moreover, abstraction is not used much. Rather, allocation is the preferred approach. About 25 percent of the value of a residential parcel is presumed to be land value, in any given neighborhood, as a starting point. It was noted, though, that this approach must be used with care. Some people who buy a lot in a high-end neighborhood may build at or close to the minimum required house size, and thus have lots that are under-improved relative to the norm for the neighborhood. The specifics of each parcel need to be considered, and the end result in some cases is that land is 50 percent, or even more, of the total improved parcel value.

Summary. In summary, the brief answers to the seven questions in our questionnaire for Goochland County are as follows:

1. The state does not provide any rules or guidelines pertaining to the requirement for the separate valuation of land and improvements.
2. There are no state guidelines on valuation techniques, or approaches.
3. Yes, multiple approaches are used in estimating land values. Goochland relies primarily on market sales data and develops tables utilizing various unit measures for different land uses in different parts of the county.
4. There has been no recent change in the valuation approach.
5. While there currently is no statistical model used in developing estimated land values, tables of land values per unit are generated and used in the valuation process, and could be made available.
6. Goochland is able to use assessment-sales ratios to check land valuation, given the number of sales of vacant land.
7. Regarding the separate values for land and improvements:
 - a. Appeals can be based on the separate land and improvements values..
 - b. The values are on the Internet and also in the county office.
 - c. Separate values are reported to the state, both for individual parcels and in the aggregate.

Summary and Conclusions

Our research for this year's fellowship builds on some of our own earlier research, as well as on other projects funded by the Lincoln Institute of Land Policy in recent years. The question of how land values used for property tax purposes are determined has important implications for continuing developments in South Africa and other developing and transitional countries, as well as within the United States and other developed nations. It is of special relevance in the 29 states that Brunori and Carr found have legal requirements for separate valuation of land and improvements for their real property taxes. It is of even greater relevance in places where different rates apply to the land and the improvements portions of real property values. Such arrangements include tax structures loosely grouped under the heading of land value taxation, such as site value taxation, which taxes only the land, and two-tier taxes that tax both land and

improvements, but at different rates. The latter also includes tax abatement programs that seek to tax land fully but, to encourage new construction and/or rehabilitation, tax only a portion of the value of improvements for some period of time.

We proposed to do case studies in four urban and four rural localities – one each in each of four states where separate land values are required – to learn more about how land values are derived. The four states selected are Maryland, Ohio, Pennsylvania, and Virginia. In the end, we studied more than two areas in both Virginia and Pennsylvania, but only one in Ohio, where we failed to gain the cooperation of private appraisal firms valuing smaller counties.

At the outset, we expected to find differences between states, based on information gained in earlier work that did not focus directly on the manner in which land values are derived. Differences between rural and urban localities also were expected due to differences in the availability of vacant land sales data. Each of these expectations was borne out to some extent, but not completely. First, in all study areas, we were told the state does not provide any specific guidelines – let alone requirements – for estimating land values. In this environment, differences exist not only between states, but within a state. Second, although we found the expected difference in land valuation approaches between areas with large numbers of vacant land sales and areas not in this position, not all urban areas fall within the latter group. For example, Fairfax County, Virginia – a county with over a million residents, located in the first tier of counties outside Washington, DC – still places primary reliance on land sales data in deriving land values.

As expected, we found two fundamental approaches to estimating land values. The first relies upon analysis of data from sales of vacant land and the second relies upon various means of estimating land value where there are not sufficient sales of vacant land. The first approach was widely used, most commonly in rural and suburban areas. Within the latter approach, we identified three different methods: abstraction, which calculates land value as the difference between total parcel value and estimated value of buildings (replacement cost less depreciation); allocation, which assigns a given "typical" percentage of total parcel value to land; and contribution value, which uses non-linear multiple regression to identify the marginal contributions to market value made by various property attributes. All methods seek to arrive at market value, although they differ in just how this is attempted; in part, they differ in which of the valuation principles identified in the literature is emphasized. For example, abstraction emphasizes the substitution principle for improvements, implying that one would not pay more for a structure than it would cost to replace it. The contribution value method emphasizes the principle of contribution, which says that value is related to effective market demand for the housing services or utility provided by various property attributes, rather than by their cost. The anticipation principle, which holds that expected future land use influences land value, also is more likely to be reflected in values derived by the contribution value method than in those derived via abstraction or allocation.

The case study areas are listed below, grouped by the primary method used to estimate land value:

- Land sales data: Garret County, MD; Lucas County, OH; Cambria County, PA; Dauphin

County, PA; Fairfax County, VA; and Goochland County, VA

- Abstraction: City of Roanoke, VA; Ebensburg, PA (within Cambria County) and Harrisburg, PA (within Dauphin County)
- Allocation: City of Baltimore, MD
- Contribution value: Several Pennsylvania counties valued by 21st Century Appraisals

Among the areas that must estimate land values without benefit of sufficient sales of vacant land, differences often are a matter of emphasis – rarely is one method used to the complete exclusion of all others. In all study areas, we were told that the values generated by whatever the primary method is cannot be put on the tax rolls until they have been reviewed to assess their reasonableness. Thus, localities that rely primarily on abstraction usually consider the percentage of total parcel value represented by land (i.e., allocation), and areas that rely primarily on allocation typically consider whether the resulting land and improvements values make sense, given the specifics for the various parcels.

We note that Lucas County's considerable efforts to improve its valuation processes, and thus its outcomes, seem to approach the contribution value method, and Fairfax County is moving in this direction with the multiple regression analysis now being developed. 21st Century Appraisals nonetheless has developed a methodology that is different from what the other areas are doing; a part of that difference is the use of separate regression models for each of several property attributes, rather than a single model that includes variables for the several attributes. Because of the proprietary nature of the models used in the various areas, though, we are not able to be more specific about the differences (although Lucas County has spelled out its methods in considerable detail in the articles cited in this report).

As a result of the work on this year's fellowship, we are more sanguine about the ability to value land reasonably accurately for land value taxation, even where there are not many sales of vacant land. The work being done in Lucas County clearly is a part of the reason for our greater optimism, but so are the things being done in Fairfax County, Roanoke, and Baltimore. One thing the latter two jurisdictions do, in dealing with the lack of vacant land sales within their borders, is "borrow" sales from other jurisdictions and use the data, tempered by judgment. This approach seems to work reasonably well, and it suggests a possibility for dealing with tribal areas in South Africa, where communal land tenure means there will be no property sales within those areas.³⁰

Still, we are concerned that the primary valuation method may make a difference in the final land value estimates. Each method attempts to arrive at market value of land, and all study areas stress the need to exercise judgment before adopting specific parcel values, but there are differences among the methods. The biggest difference, we believe, is between areas using a contribution value methodology and those using one of the other methods. Contribution value seeks to determine the effect of each of several property attributes on the market value of the property – i.e., the contribution of each attribute to the property's value – and it seems to do this in a way that is likely to be more successful than one of the other methods, in large part because the approach is more systematically comprehensive in considering the many influences on value. An example earlier in the report (page 6) – the residential parcel with a sound barn on it that adds less to market value than its replacement cost – helps to clarify this concern.

When we made this point at the Lincoln Fellows Symposium in October 2005, some in attendance expressed the view that any differences among the methods indicated a "mistake" had been made by someone. The basic point seemed to be that all valuation approaches should produce the same result, a view often encountered. If they don't, where is the mistake? Perhaps the appraiser has not applied one or more of the approaches properly. Or, in the case of the old but sound barn no longer being needed for farm use, perhaps the "mistake" was in building the barn; this sort of mistake, it is said, will be taken care of by the market. Of course, that is just the point of the illustrated difference between the abstraction method and the contribution value method. The market seemingly had made its correction, and the barn added little to the value of the property once its highest and best use was residential. However, the abstraction method failed to pick up this change; it used replacement cost of the barn – a cost that exceeded the barn's contribution to the property's market value – and thus under-valued the land. There may be assessor error here, in not getting the economic obsolescence of the barn right, but the abstraction method seems less likely than a non-linear, multivariate contribution value model to get this right. Indeed, both the allocation method and the abstraction method may result in over- or under-valuation of land because they make no explicit, systematic attempt to take into account a host of attributes – of both land and improvements – to find their individual contributions to property value. We are concerned about the wide application of the abstraction method of valuing land in areas where there are limited sales. Such an approach can result in values that significantly diverge from contribution values, especially over time. Further exploration of the relative performance of the three land valuation methods is the crux of our third-year David C. Lincoln Fellowship, in 2006.

References

- Advisory Commission on Intergovernmental Relations. 1974. *The Property Tax in a Changing Environment: Selected State Studies*. M-83. Washington, DC: U. S. Government Printing Office.
- Ashley, Richard, Florenz Plassmann and Nicolaus Tideman, 1999, *Improving the Accuracy of Downtown Land Assessment*, Lincoln Institute of Land Policy, Cambridge, Massachusetts, Working Paper WP99RA1
- Bell, Michael E. and John H. Bowman. 2002. Factors Influencing the Choice of Site Value Taxation Among Local Governments. @ In *Property Taxes in South Africa: Challenges in the Post-Apartheid Era*, edited by Michael E. Bell and John H. Bowman. Cambridge, MA: Lincoln Institute of Land Policy, Chapter 6.
- Bell, Michael E. and Lindsay C. Clark with Joseph Cordes and Hal Wolman. 2004. Intra-metropolitan Area Fiscal Disparities and the Property Tax. @ Washington, DC: George Washington University, Institute for Public Policy, Working Paper Series.
- Bowman, John H. and Michael E. Bell. 2004. Implications of a Split-Rate Real Property Tax: An Initial Look at Three Virginia Localities. @ *State Tax Notes*, 32(April 26): 261-91. [Also available as Lincoln Institute Working Paper WP04JB1 [<http://www.lincolninst.edu>].
- Bowman, John H. and John L. Mikesell. 1978. A Uniform Assessment of Property: Returns from Institutional Remedies. @ *National Tax Journal*, 31(June): 137-52.
- Brown, H. James, ed. 1997. *Land Use & Taxation: Applying the Insights of Henry George*. Cambridge, MA: Lincoln Institute of Land Policy.
- Brunori, David and Jennifer Carr. 2002. Valuing Land and Improvements: State Laws and Local Government Practices. @ Cambridge, MA: Lincoln Institute of Land Policy, Working Paper WP02DB1 [<http://www.lincolninst.edu>].
- Connellan, Owen. 2004. *Land Value Taxation in Britain: Experience and Opportunities*. Cambridge, MA: Lincoln Institute of Land Policy.
- Downing, Roger H. 2004. *Quality of Assessments Based on the "1999 IAAO Standard" A Study of Pennsylvania Counties Based on 2003 STEB Data*, Lemont, PA: the author, August.
- Eckert, Joseph K., ed. 1990. *Property Appraisal and Assessment Administration*. Chicago, IL: International Association of Assessing Officers.
- George, Henry. 1879. *Progress and Poverty*. New York, NY: Robert Schalkenbach Foundation (1990 reprint).

- German, Jerome C. 2004. "The Implications of Using Spatial Analysis for Land Valuation Modeling in Geographic Information Systems (GIS) for Split Rate Taxation." Presented at the Lincoln Institute of Land Policy seminar, *Two-Rate Taxation on Land and Buildings*, Washington, DC, June 23.
- Gloude-mans, Robert J. 2002. *An Empirical Analysis of the Incidence of Location on Land and Building Values*, Lincoln Institute of Land Policy, Cambridge, Massachusetts, Working Paper WP02RG1.
- Gloude-mans, Robert J. 2000. *Implementing a Land Value Tax in Urban Residential Communities*, Lincoln Institute of Land Policy, Cambridge, Massachusetts, Working Paper WP00RG1.
- Goudemans, Robert J., Sheldon Handel and Michael Warwa. 2002. *An empirical Evaluation of Alternative Land Valuation Models*, Lincoln Institute of Land Policy, Cambridge, Massachusetts, Working Paper WP02RG2.
- Knapp, John L. 2005. *Classification of the Assessed Value of Locally Assessed Real Property in Virginia, 2004-2005*. Charlottesville, VA: Weldon Cooper Center for Public Service, University of Virginia. April 18.
<http://www.coopercenter.org/econ/sitefiles/documents/pdf/classcoderesult.pdf>
-
- _____ and Stephen C. Culp. 2005. *2004 Tax Rates: Virginia's Cities, Counties, and Selected Towns*. 23rd Annual Edition. Charlottesville, VA: Weldon Cooper Center for Public Service, University of Virginia. [The last eight reports are available electronically:
<http://www.coopercenter.org/publications/ECONOMICS/Local%20Taxes.php>.]
- Lindholm, Richard W. (editor). 1969. *Property Taxation USA*. Madison, WI: The University of Wisconsin Press.
- Mills, Edwin S. 1998. "The Economic Consequences of a Land Tax." In *Land Value Taxation: Can It and Will It Work Today?*, edited by Dick Netzer. Cambridge, MA: Lincoln Institute of Land Policy, pp. 31-48.
- Myers, Will S., Jr. 1967. "A General Appraisal of the Effect of Exemptions on Tax Base." in *The Property Tax: Problems and Potentials*. Princeton, NJ: Tax Institute of America, pp. 267-82.
- National Tax Association Property Taxation Committee. 1971. "The Erosion of the Ad Valorem Real Estate Tax Base." Interim Report of the Property Taxation Committee. Columbus, OH: National Tax Association, pp. 457-500.
- Netzer, Dick. 1997. "The Centralization and Decentralization of Government and Taxation." In *Land Use & Taxation: Applying the Insights of Henry George*, edited by H. James Brown. Cambridge, MA: Lincoln Institute of Land Policy.

- _____, ed. 1998a. *Land Value Taxation: Can It and Will It Work Today?* Cambridge, MA: Lincoln Institute of Land Policy.
- _____. 1998b. "Introduction." In *Land Value Taxation: Can It and Will It Work Today?*, edited by Dick Netzer. Cambridge, MA: Lincoln Institute of Land Policy, pp. x-xviii.
- _____. 1998c. "The Relevance and Feasibility of Land Value Taxation in Rich Countries." In *Land Value Taxation: Can It and Will It Work Today?*, edited by Dick Netzer. Cambridge, MA: Lincoln Institute of Land Policy, pp. 109-36.
- Oates, Wallace E. and Robert M. Schwab. 1997. "The Impact of Urban Land Taxation: The Pittsburgh Experience." *National Tax Journal*, 50(March): 1-21.
- Oldman, Oliver and Mary Miles Teachout, 1978. "Land Valuation Under A Separate Tax On Land," *National Tax Association/Tax Institute of America: Proceedings of the Seventieth Annual Conference*, Louisville, Kentucky, November 6-10m 1977, National Tax Association, Columbus, Ohio.
- Reschovsky, Andrew. 1998. "Can the Land Value Tax Play an Important Role in the Financing of State and Local Governments in the United States?" In *Land Value Taxation: Can It and Will It Work Today?*, edited by Dick Netzer. Cambridge, MA: Lincoln Institute of Land Policy, pp. 211-46.
- Schachtel, Marsha R. B., Aaron M. Glazer, and Michael E. Bell. 2002. *Alternative Revenue Sources and Structures for Baltimore City*. Study initiated by the Baltimore Efficiency and Economy Foundation with funding assistance from The France-Merrick Foundation, the T. Rowe Price Associates Foundation, and the City of Baltimore.
- Schwab, Robert M. and Amy Rehder Harris. 1998. "An Analysis of the Graded Property Tax." In *Taxing Simply, Taxing Fairly: District of Columbia Tax Revision Commission Full Report, Part II: Consultants' Reports*. Washington, DC: District of Columbia Tax Revision Commission, Chapter G.
- Sitrin, Laura L. and Dorothy O. Bennett. 2001. "Consideration of Split-Rate (Land Value) Taxation." Memorandum from City of Fairfax, Virginia, Director of Finance Sitrin and Real Estate Assessor Bennett to City Manager Bob Sission. September 18.
- U. S. Census Bureau. 2005. *2002 Census of Governments. Vol. 4, No. 4, Finances of Municipal and Township Governments: 2002*. Washington, DC: U. S. Government Printing Office. [<http://www.census.gov/prod/2005pubs/gc024x4.pdf>]
- _____. 2002. *2002 Census of Governments. Vol. 1, No. 1, Government Organization*. Washington, DC: U. S. Government Printing Office. [<http://www.census.gov/prod/2003pubs/gc021x1.pdf>].

_____. 1984. *1982 Census of Government. Vol. 2, Taxable Property Values and Assessment-Sales Price Ratios*. Washington, DC: U. S. Government Printing Office.

_____. American FactFinder, available from the Census Bureau's website:
http://factfinder.census.gov/home/saff/main.html?_lang=en

_____. State and County QuickFacts, available from the Census Bureau's website:
<http://quickfacts.census.gov/qfd/index.html>

_____. State and Local Government Finances, available from the Census Bureau's website: <http://www.census.gov/govs/www/estimate.html>

Virginia Auditor of Public Accounts. 2005. *Comparative Report of Local Government Revenues and Expenditures*. Richmond, VA: Auditor of Public Accounts. [Annual series available electronically:
http://www.apa.state.va.us/local_government/comparative_cost.htm.]

Virginia Department of Taxation. 2005. *The 2003 Virginia Assessment/Sales Ratio Study*. Richmond, VA [http://www.tax.virginia.gov/Web_PDFs/2003ratiostudy.pdf].

Walker, Mabel. 1962. Land Use and Local Finance, Part III, Fiscal Aspects of Land Use. In *Tax Policy*, 29(July-September): 3-44. (Tax Policy was published by the Tax Institute of America, which was subsequently absorbed into the National Tax Association.)

Ward, Richard. 2002. "Demonstration of Computer-Assisted Mass Appraisal: Three Pilot Studies." In *Property Taxes in South Africa: Challenges in the Post-Apartheid Era*, edited by Michael E. Bell and John H. Bowman. Cambridge, MA: Lincoln Institute of Land Policy, Chapter 7.

Ward, Richard D.; James R. Weaver; and Jerome C. German. 1999. "Improving CAMA Models Using Geographic Information Systems/Response Surface Analysis Location Factors." *Assessment Journal*, 6(January/February): 30-38.

Ward, Richard; Jason Guilford; Brian Jones; Debbie Pratt; and Jerome German. 2002. "Piecing Together Location: Three Studies by the Lucas County Research and Development Staff." *Assessment Journal*, 9(September/October): 15-48.

Wenzer, Kenneth C., ed. 1999. *Land-Value Taxation: The Equitable and Efficient Source of Public Finance*. Armonk, NY: M. E. Sharpe.

Wuensch, Jeff, Frank Kelly and Thomas Hamilton, 2000, *Land Value Taxation Views, Concepts and Methods: A Primer*, Lincoln Institute of Land Policy Working Paper Series, WP00JW2.

Endnotes

¹ See, for example, George [1879], Brown [1997], Netzer [1998a], Connellan [2004], and Wenzer [1999].

² Mabel Walker reported that this form of tax was authorized for Pittsburgh and Scranton in 1913 and became effective in 1914, and pronounced the Pittsburgh tax “the most important” experiment in land value taxation in the United States [Walker 1962, p. 18].

³ See Bowman and Bell [2004]. To date, neither city has adopted a split-rate tax.

⁴ Examples include the District of Columbia [Schwab and Harris 1998] and Maryland [Schachtel, Glazer, and Bell 2002].

⁵ South Africa historically has allowed local governments to tax just land value, land and improvements at the same rate, or land and improvements at different rates. In their work there, the authors found empirical support for the notion that taxing only land may enhance administrative efficiency [Bell and Bowman 2002, p. 99]; requiring fewer resources to generate public revenues is another form of economic efficiency.

⁶ Although our emphasis here is on the correct division of total value between land and improvements in the early stages of land value taxation, an accurate valuation approach will be critical in later stages, as well. Market forces may be expected to change the relative values of land and improvements once the tax rates on the two components are differentiated, and it will be important to be able to capture accurately the true market value of land as it changes, if land value taxation’s benefits are to be fully realized [Netzer 1998b, p. xiii; Mills 1998, pp. 44-47].

⁷ An exception is business property. If property tax valuation information is used as a basis for determining depreciation, the taxpayer will be interested in how total value is divided between land and improvements, because only the latter can be depreciated.

⁸ Bowman and Mikesell [1998] found that a higher effective tax rate and a higher assessment level both contributed importantly to achieving more uniform assessments. They note that both the assessment level and effective tax rate level (tax intensity) affect tax uniformity [pp. 143-45], and their discussion of the rationale for these variables’ effects focuses on the role of taxpayer appeals [pp. 140-41].

⁹ That exempt property tends not to be valued in most states is indicated by ACIR [1973, pp. 4-5, 15], Myers [1967, pp. 268-69], and the National Tax Association Committee on Property Taxation [1971, p. 460].

¹⁰ The assumption, which may be unjustified, is that political or other motivations would not affect valuation adjustment upon appeal.

¹¹ Brunori and Carr 2002, p. 2. This study was restricted to the legal sources noted, excluding such other possible sources of such a requirement as administrative rules and regulations. Thus,

it is possible that once all 50 states and the District of Columbia have been examined more fully, more than 29 may be found to have some sort of requirement for separate valuation.

¹² Two types of adjustment are necessary when using the depreciated cost approach. One is to adjust the cost approach for differences in the cost of materials from one area to another. For example, the cost of a 2x4 may be higher in one area than another. Using a standard cost table for all areas may miss this type of difference, so assessors may adjust the cost coefficients to reflect the market for supplies in different neighborhoods or different jurisdictions. A second type of adjustment, which is addressed by Gloudemans, is needed when the contribution value of various characteristics of a house vary because the houses, while identical in structure, are located in different market areas. The market value of two houses will be different, even though they are identical structures with identical replacement costs, if one house is in a neighborhood undergoing gentrification and the other is in a neighborhood in decline.

¹³ Their coefficient of variation was 0.488, compared to the assessor's 0.542.

¹⁴ Except where otherwise noted, all socio-economic and government finance data in this section and for the other case studies are from the Census Bureau's website sources in the reference list. Government finance statistics are from State and Local Government Finances; national data are for fiscal 2003, while state data disaggregated into the state and the local components are from the 2002 Census of Governments; each is the most recent information available at the time of writing. Information on population, income, and housing are from State and County QuikFacts and, to a lesser extent, American FactFinder.

¹⁵ Kent County has an estimated 2004 population of 19,582 and Somerset County has an estimated 2004 population of 25,863.

¹⁶ The 2002 Census of Governments identified 42 such independent cities in three states, 39 of them in Virginia [Census Bureau 2002, Appendix B]. Note that there is also a Baltimore County, which is adjacent to but independent of, the city of Baltimore.

¹⁷ *Maryland Assessment Procedures Manual*, Valuation (Section 014), Market Approach (Market Value Index).

¹⁸ Ohio Department of Taxation data include both municipal and school district income taxes: [http://www.tax.ohio.gov/divisions/tax_analysis/tax_data_series/individual_income/publications_tds_individual.stm]. Nearly one-fourth (145) school districts in Ohio also levy an income tax, but their total yield for the latest year was only about \$170 million, leaving property taxes to raise nearly 98 percent of school district taxes.

¹⁹ For other areas, 2004 population estimates have been used. However, as late as December 19, 2005, the Census Bureau had not posted a 2004 figure for Toledo.

²⁰ As the reader will find in the write-ups for various case study areas, proprietary models and valuation techniques often are used and the details are not shared. Lucas County has provided more details than most areas, and further details will be made public in professional journals and proceedings over the next year or two.

²¹ Only municipalities can implement a two-tier tax. Counties and school districts, which overlie municipal areas, are not permitted to implement this option.

²² Pittsburgh also introduced the two-tier property tax in 1913, but repealed the two-tier provision of the local property tax in 2004.

²³ The actual tax differentials adopted by the city council was 30 mills on land and 12.6 mills on improvements – a ratio of about 2.4 to 1.

²⁴ Even given this increase in taxes, the owner of the golf course appeared before the council to testify in favor of the shift to a two-tier tax.

²⁵ The information is available at <http://www.dauphinpropertyinfo.org>; a legal description or address is needed to access the information for a particular parcel. City of Harrisburg properties have the numbers 01 through 15 as the last two digits in the parcel identification number.

²⁶ There is also a city of Fairfax, which is surrounded by the county of the same name, but is independent of the county. The city is much smaller, both in terms of population (21,498 in 2000) and land area. Care therefore must be taken in accessing data for "Fairfax."

²⁷ Note that there is also a Roanoke County in Virginia; the city and county sharing the same name are adjacent but independent jurisdictions.

²⁸ The role of zoning in this situation is not clear. If land in the city is scarce, large parcels might command a premium, if placed on the market, for they would provide more possibilities for development.

²⁹ The site for the County Assessor's Office [<http://www.co.goochland.va.us/county.asp?section=1562&subsection=2001>] includes a link to the Virginia Mass Appraisal Network [<http://www.vamanet.com/cgi-bin/MAPSRCHPGM?LOCAL=GOO>], where information on individual parcels can be accessed in a variety of ways.

³⁰ Ward [2002] describes projects in South Africa demonstrating use of computer-assisted mass appraisal to value properties. Some rural areas, including tribal lands, were included in the demonstration projects.