

# *Market Value Assessment in Niagara: The Regional Dimension*

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## **PRÉCIS**

Tout changement de système d'évaluation foncière imposable risque de provoquer de vives controverses car il en résulte ordinairement une redistribution des obligations fiscales. Les propositions à l'adoption un système d'évaluation basé sur la valeur marchande dans de nombreuses villes ontariennes peuvent être particulièrement controversées parce qu'elles sont susceptibles d'avoir des effets à deux niveaux. La plupart des régions urbaines de l'Ontario sont organisées selon un système de municipalités locales et régionales. Les évaluations foncières déterminent la distribution du prélèvement fiscal local sur les biens fonciers locaux; de plus, dans chaque municipalité, l'évaluation foncière totale est le facteur déterminant quant à la répartition des prélèvements fiscaux régionaux entre les municipalités locales. Si l'équité fiscale dans une municipalité locale exige un rapport constant entre l'évaluation foncière et la valeur marchande pour toutes les propriétés, une distribution équitable des prélèvements fiscaux régionaux nécessite la possibilité soit d'imposer les biens fonciers d'une manière identique dans toutes les municipalités locales, soit de rajuster les évaluations locales pour les rendre comparables dans toute la région.

Dans cette étude, les auteurs évaluent l'exactitude du système d'évaluation foncière en vigueur en le comparant avec des évaluations basées sur la valeur marchande pour un échantillon de propriétés résidentielles dans six municipalités locales situées dans la municipalité régionale de Niagara datant de 1988. Les résultats indiquent que l'évaluation selon la valeur marchande est plus étroitement liée aux prix de vente réels des biens fonciers, et que les deux prélèvements fiscaux, le local et le régional, sont distribués d'une manière plus équitable quand on applique un système d'évaluation selon la valeur marchande. De plus, les évaluations basées sur la valeur marchande de l'échantillon ne dénotent pas d'erreurs constantes entre les diverses municipalités locales. Les auteurs terminent en discutant du besoin de mettre à jour régulièrement les évaluations selon la valeur marchande afin d'assurer que l'équité fiscale soit maintenue.

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**ABSTRACT**

Changes in any system of property tax assessment can be highly controversial, for they imply a redistribution of tax liabilities. Proposals to move to market value assessment in many Ontario cities can be especially controversial because they have the potential for two levels of effects. Most urban areas in Ontario are organized into a two-tier system of local and regional municipalities. Property tax assessments determine the distribution of the local tax levy across local properties; in addition, the total assessment in each municipality plays the primary role in determining the distribution of the regional tax levy among local municipalities. While equity within a local municipality requires a consistent ratio of assessment to market value across properties, an equitable distribution of the regional tax levy requires the ability either to assess property consistently across local municipalities or to adjust local assessments to make them comparable across the region.

In this study, the authors test the accuracy of the current assessment system as compared with market value assessments for a 1988 sample of residential properties in six local municipalities spread across the regional municipality of Niagara. The results indicate that market value assessment is more closely related to actual sales prices of properties and that both local and regional tax levies are distributed more equitably under a system of market value assessment. In addition, the sample market value assessments do not exhibit consistent error patterns across local municipalities. Finally, the authors discuss the need for the updating of market value assessments if equity is to be maintained over time.

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**INTRODUCTION**

Twenty-seven years ago, the Ontario Committee on Taxation (the Smith committee) found significant biases in the assessment of real property.<sup>1</sup> The report documented the overassessment of newer and suburban homes relative to older and central-city homes. It also found significant biases between property classes, including the relative overassessment of industrial and commercial property. Real property, the report concluded, should be assessed at market value.

The report contributed to pressure for reform of the property tax. It also added to growing opposition to the redistributive implications of market value assessment, for altering the assessed value of a property affects not only annual tax liabilities, but also the market value of the property.<sup>2</sup> In 1978, the treasurer of Ontario announced that there would be

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<sup>1</sup> Ontario Committee on Taxation, *Report* (Toronto: Queen's Printer, 1967) (3 volumes).

<sup>2</sup> For a good review of property tax "capitalization" issues, see Harry M. Kitchen, *Property Taxation in Canada*, Canadian Tax Paper no. 92 (Toronto: Canadian Tax Foundation, 1992).

no general reassessment of real property in the province but that municipalities could apply to the province for voluntary reassessments of one or more classes of property. Since then, some municipalities have moved to market value assessment, but others have encountered fierce opposition because of the tax redistribution it would produce.

More recently, reports from the Ontario Fair Tax Commission have raised fundamental objections to property tax systems. Any property tax, it argues, fails as an equitable method of financing those services for which taxes are more appropriately based on ability to pay or on a "share of consumption" basis. Property taxes are suitable only for those services that fit neither of these categories; and while assessment practices should be consistent across the province, market value assessment is problematic because of the volatility of property values over time.<sup>3</sup> These objections, while important, deal with issues beyond the more narrow scope of this study, which focuses on the performance of a system that claims to tax property on the basis of some measure of its value. Nevertheless, the commission's concerns, together with the earlier objections, lend support to Roger Smith's view that active opposition and some modest reforms undertaken in the 1970s and 1980s will combine to keep support for market value assessment below the level required for major amendments to the system.<sup>4</sup>

Any revision of the property tax assessment system in Ontario has a twofold impact, since most local municipalities are part of a system of regional municipal government. Both local, or "lower-tier," municipalities and regional, or "upper-tier," municipalities raise revenues through the property tax. The lower-tier municipality levies a property tax on the value of assessed property in the customary way. The regional government, on the other hand, levies its tax on each lower-tier municipality according to the municipality's share of total assessment in the region; the lower-tier municipality then raises this regional levy by adding the required number of points to its own mill rate on assessed property. The property tax assessment system therefore affects both lower- and upper-tier tax liabilities. Disputes over lower-tier assessments are a familiar issue. Upper-tier tax levies also are subject to disagreement; a conspicuous example is the recent threat from some politicians in the city of Toronto to secede from the municipality of Metropolitan Toronto should the proposed Metro-wide market value assessment proceed. The stated reason is the increase in upper-tier tax liabilities that would accrue to residents within the city of Toronto. Other cities within Metro are, of course, arguing for reform.

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<sup>3</sup> Ontario Fair Tax Commission, Property Tax Working Group, *Report*, prepared for the treasurer of Ontario (Toronto: Ontario Fair Tax Commission, December 1992), and *Fair Taxation in a Changing World: Report of the Ontario Fair Tax Commission* (Toronto: University of Toronto Press, 1993).

<sup>4</sup> Roger S. Smith, "Why the Canadian Property Tax(payer) Is Not Revolting" (1990), vol. 38, no. 2 *Canadian Tax Journal* 298-327.

In this study, we analyze the proposed system of market value assessment in the regional municipality of Niagara, with the aim of providing a test of reforms in the context of an Ontario regional government. The regional municipality was established by provincial legislation on January 1, 1970. It encompasses what had been 26 municipalities and townships, now reduced by amalgamations to 12 lower-tier municipalities distributed over a total area of 1,850.9 square kilometres. The regional municipality, with a population of 393,936 in 1991, includes lower-tier municipalities ranging in size from Wainfleet (pop. 6,203) to St. Catharines (pop. 129,300). Some local municipalities are largely agricultural, some rely heavily on summer tourism, and others are primarily industrial.

Administration of a property tax under such circumstances is not an easy matter. Size and diversity may make it difficult to maintain equitable property tax assessments across the region, assuming as a standard for equity that assessed values must be equal to, or equally proportional to, the market values of properties. This criterion applies both within individual municipalities and across the 12 lower-tier municipalities in the region, and it creates the possibility of three categories of inequity in Niagara: inequities between property classes, within property classes, and across municipalities.

There are three systemic causes of tax inequities between property classes in Niagara, as elsewhere in Ontario:

1) Different classes of property are generally assessed at different proportions of market value. Typically, commercial and industrial property is assessed at a higher proportion of market value than is residential property. In 1988 in the Niagara region, for example, one- and two-unit residential dwellings were assessed at 4.698 percent of market value; comparable figures for commercial property and industrial/manufacturing property were 7.163 and 12.4 percent, respectively.<sup>5</sup>

2) The province has mandated that the residential mill rate be 15 percent below the rate set for commercial and industrial properties.

3) A business tax is levied on non-residential property, with the rate varying according to the type of business.

These mandated inequities, in turn, are affected by any errors that may occur in the process of assessment. As important as this inequity between property classes may be, it is not a subject of this study.

The second inequity, that within property classes, arises when properties within the same class and with the same market value are assessed differently and, as a consequence, incur different property tax liabilities. It does not matter whether properties are assessed at full market value or a portion of market value; the inequity exists as long as the ratio of

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<sup>5</sup> Enid Slack, *An Analysis of Expenditures and Revenues in the Regional Municipality of Niagara*, a study for the Niagara Region Review Commission (Niagara Falls, Ont.: Niagara Region Review Commission, November 1988), 46, table 19.

assessment to market value is not constant across properties. This inequity was the focus of the recent Winnipeg study by Dean, Hum, and Stevens.<sup>6</sup> They document the improvements in equity within the residential class of property as a result of that city's move to market value assessment in 1987. Further results for the 1990 Winnipeg reassessment indicate an improvement in equity over 1987, suggesting that over time market value assessments may continually improve in quality.<sup>7</sup> This issue, the examination of equity among residential properties within a lower-tier municipality, will be one focus of our analysis.

In Niagara, as in other Ontario regional municipalities, there is the potential for a third type of inequity that arises out of the system of financing the regional government. As noted earlier, the regional municipality of Niagara raises its revenues indirectly by imposing a levy on each lower-tier municipality equal to that municipality's share of total assessment in the region. Inequity among lower-tier municipalities may therefore arise if properties with similar market values in different municipalities pay different proportions of the regional tax levy. This is an important matter, for the amounts involved in the regional levy in Niagara are not insignificant. About 45 percent of property taxes paid in 1988 were school board taxes, 31 percent were paid to the lower-tier municipality, and 24 percent were paid to the regional municipality. Distributing this regional tax levy across 12 local municipalities creates the potential for significant errors that may affect equity among taxpayers in different lower-tier municipalities. As Harry Kitchen argues, "Failure to move toward a system of uniform assessment creates inequities in the treatment of taxpayers across municipalities."<sup>8</sup> This is the second issue we explore.

We are able to examine inequities in Niagara with data gathered for a special study by the assessment office, based upon homes sold in 1988. The sample consists of data for what are known as class 0 properties: residential dwellings with one or two units. The information assembled for each residential property includes current assessment, market value assessment, sales price, and a number of housing characteristics used in the current assessment process. We use data from five widely separated municipalities within the regional municipality of Niagara: Fort Erie, Lincoln, Port Colborne, Pelham, and West Lincoln. In one municipality, Lincoln, data were available for two separate areas: one (Lincoln 1) is centred on the town of Beamsville; the other (Lincoln 3), on the town of Jordan. Since these are geographically separate towns, we treat the two areas independently, giving us a final sample of six distinct municipal

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<sup>6</sup> James M. Dean, Derek P.J. Hum, and Harvey Stevens, "Improving Property Assessment: A Study of the Winnipeg Reassessment" (1989), vol. 37, no. 1 *Canadian Tax Journal* 93-112.

<sup>7</sup> James M. Dean, Derek P.J. Hum, and Harvey Stevens, "Reform Revisited: The 1990 Winnipeg Reassessment" (1991), vol. 39, no. 5 *Canadian Tax Journal* 1305-12.

<sup>8</sup> Niagara Region Review Commission, *Report and Recommendations* (Toronto: Ontario Ministry of Municipal Affairs, October 1989), 113.

areas. All areas encompass both small towns or cities and rural countryside. Several (Fort Erie and Port Colborne) contain some industrial activity; others are largely agricultural. Fort Erie and Port Colborne are on the shores of Lake Erie and are the sites of a large number of summer vacation properties. Lincoln borders Lake Ontario. Our sample areas span in excess of 60 kilometres from West Lincoln in the northwest to Fort Erie in the southeast. The size of the sample ranges from 252 residential properties in West Lincoln to 958 in Fort Erie; the total for all six areas is 3,728 (see table 1).

### EQUITY IN APPORTIONMENT OF THE REGIONAL LEVY

While Ontario's Ministry of Revenue assesses properties in all municipalities in the region, not all properties are assessed on the basis of property values in the same year. Property in most lower-tier municipalities is assessed on the basis of 1940 property values; but the assessment in Wainfleet is based on 1975 values, in Niagara Falls on 1980 values, and in Niagara-on-the-Lake on 1984 values. In addition, local municipalities have experienced different rates of increase in property values over the years, so that even the use of the same year for the assessment base does not guarantee assessments that are similarly related to current property values. Data confirm the differences. In 1988, the ratio of assessed to market value for one- and two-unit residential dwellings ranged from an average of 0.04134 in Lincoln to 0.05684 in Port Colborne.<sup>9</sup> The regional government, however, requires comparable assessments across lower-tier municipalities in order to apportion its tax levy. To produce this comparability, each year the Ministry of Revenue estimates an "equalization factor" for each lower-tier municipality. This equalization factor is a three-year weighted average of the ratios of assessment to estimated market value for each class of property in the municipality.<sup>10</sup> In 1988, the equalization factors ranged from 3.5 percent in Niagara-on-the-Lake to 7.75 percent in Welland, indicating that the ratio of assessment to estimated market value was over twice as high in Welland as in Niagara-on-the-Lake. Dividing total assessment by these equalization factors produces total equalized assessment for the lower-tier municipalities. With several small adjustments, this becomes the municipality's total "discounted equalized assessment," and the municipality's share of the region's tax levy is equal to its share of the region's total discounted equalized assessment, or what we will refer to more simply as equalized assessment.<sup>11</sup>

<sup>9</sup> Slack, *supra* footnote 5, at 46, table 19.

<sup>10</sup> The town of Fort Erie is a special case; because of earlier amalgamations, it contains four districts, each with a different ratio of assessed to market value. The equalization factor for the town is therefore a weighted average of factors for the four districts.

<sup>11</sup> In the calculation of total assessment for a lower-tier municipality, residential and farm assessments are discounted by an "upper-tier discount factor" established by the province each year.

**Table 1 Percentage Distribution of Sales and Assessments, Niagara Region, 1988**

City	No. of properties	Av. ass.	Av. MVA	Av. eq. ass.	Percentage of		
		Av. sale price	Av. sale price	Av. sale price	Total eq. ass.	Total sales price	Total MVA
		%	%	%	%	%	%
Fort Erie . . . .	958	4.31	96.04	69.86	18.97	19.40	19.38
Lincoln 1 . . .	598	3.61	97.15	71.82	19.11	19.01	19.21
Lincoln 3 . . .	386	3.32	92.50	65.96	11.76	12.74	12.26
Port Colborne	801	4.62	95.94	62.21	12.67	14.55	14.52
Pelham . . . . .	733	3.71	96.70	80.21	30.81	27.44	27.60
West Lincoln	252	3.56	98.74	69.47	6.66	6.85	7.04
Total . . . . .	3,728				100.00	100.00	100.00

Aggregate inter-urban equity under the present system requires that the ratio of total equalized assessment to total market value be the same in each lower-tier municipality. Similarly, under a system of market value assessment, equity requires that the ratio of total market value assessment to total market value be equal in each lower-tier municipality. Since the first of these ratios depends upon the equalization factors, comparison of the two systems is in effect a test of the current regional equalization factors as compared with market value assessment. Note that this is not a test of individual property assessments, since offsetting errors in the assessments of individual properties could still produce accurate aggregate assessments for municipalities.

The 1988 data in table 1 allow these comparisons; for convenience, we show average rather than total assessment and sales price figures. The table contains the ratios of average assessment, equalized assessment, and market value assessment (MVA) to average sales price in each municipality in our sample. The table also shows the percentage distribution of total assessments and total sales prices among municipalities. These data allow us to calculate, in table 2, the differences between each city's share of total sales price and its shares of total equalized assessment and total market value assessment; a minus sign indicates over-assessment. As table 2 shows, the total equalized assessment error ranges from overassessment of 3.37 percent in Pelham to underassessment of 1.88 percent in Port Colborne; comparable figures for market value assessment are much lower, ranging from overassessment of 0.2 percent in Lincoln 1 to underassessment of 0.48 percent in Lincoln 3. In addition, with only one exception the aggregate assessment error under market value assessment is smaller than the comparable error under the current system. The exception is Lincoln 1, where the error in both cases is extremely small. On this basis, we conclude that market value assessment leads to a more equitable distribution of the regional tax levy across the lower-tier municipalities.

**Table 2 Differences Between Percentage Shares, Niagara Region, 1988**

City	Sales price less equalized assessment	Sales price less MVA
	%	
Fort Erie .....	0.43	0.02
Lincoln 1 .....	-0.10	-0.20
Lincoln 3 .....	0.98	0.48
Port Colborne .....	1.88	0.03
Pelham .....	-3.37	-0.16
West Lincoln .....	0.19	-0.18

Source: Calculated from data in table 1.

### EQUITY WITHIN A MUNICIPALITY

Individual property assessments within each lower-tier municipality determine the distribution among properties of both the local tax levy and the total regional tax levy allocated to the municipality. Intra-urban equity in the distribution of both of these tax levies, whether under current or market value assessment systems, requires equality in the ratio of assessed value to sales price across properties in the lower-tier municipality. We test this initially (as do Dean, Hum, and Stevens). Table 3 shows, for each municipality, the median ratios of current assessment to sales price and market value assessment to sales price; the table also shows the relative coefficients of dispersion for each method of assessment, where the relative coefficient of dispersion is the difference between the assessment/sales ratio and the median ratio, expressed as a percentage of the median ratio. In every case, the coefficient of dispersion is reduced under market value assessment, as was the case in the Winnipeg study. In Niagara, the average of the lower-tier coefficients, weighted by sample size, is 22.1 percent for the current assessment system and 14.9 percent for market value assessment. These results confirm that within each municipality, market value assessment evaluates individual properties more accurately, and in Niagara the improvement appears to be even greater than in Winnipeg.<sup>12</sup>

Apart from overall accuracy in the assessment of a property, it is desirable that there be no systemic bias in the assessment of any individual housing characteristic. This requirement emphasizes the view, as Dean, Hum, and Stevens point out, that house prices are hedonic prices, based on the market's valuation of specific characteristics of the house.<sup>13</sup> Accurate "hedonic assessment" may be important to preserve lasting equity if the market's valuation of different housing characteristics changes over time. Such changes may occur as a result of modifications in tastes,

<sup>12</sup> Comparable weighted averages for Winnipeg are 18.29 percent in 1984 and 17.5 percent for market value assessments in 1987. These figures are calculated from data in Dean, Hum, and Stevens, *supra* footnote 6, at 109, table 2.

<sup>13</sup> *Ibid.*, at 110.

**Table 3 Median Assessment/Sales Ratio and Relative Coefficients of Dispersion for Class 0 Dwellings in Niagara Region, by City, 1988<sup>a</sup>**

	Number of observations	Median assessment/ Sales ratio		Relative coefficient of dispersion (%)	
		Current system	Market value assessment	Current system	Market value assessment
Fort Erie . . . .	958	0.0423	0.9726	26.67	15.10
Lincoln 1 . . .	598	0.0376	0.9911	19.11	13.37
Lincoln 3 . . .	386	0.0354	0.9614	20.77	13.39
Port Colborne	801	0.0460	0.9565	23.11	19.01
Pelham . . . . .	733	0.0387	0.9806	19.09	11.93
West Lincoln	252	0.0358	1.0000	18.88	15.39
Weighted average . . . .				22.10	14.90

<sup>a</sup> Class 0 includes residential dwellings containing one or two units.

demographics, or even property tax rates themselves. Thus, intra-urban equity should have a dynamic quality to it.

Our test for intra-urban equity is similar to that used by Dean, Hum, and Stevens, and is based on data for 1988. For each property, we measure *ERROR1*, which is the difference between the sales price and the current assessment, and *ERROR2*, which is the difference between the sales price and the market value assessment for the property.<sup>14</sup> In each municipality, we then regress each of these *ERROR* variables on a set of housing characteristics gathered from the assessment rolls. There are many housing characteristics in the assessment data, but we restrict ourselves to 17 variables so as to avoid problems of multicollinearity. We would expect the *ERROR2* equations to show a poorer fit, indicating less systemic bias under market value assessments. The estimating equations, two for each of the six municipal areas, are as follows:

$$ERROR_y = a + bX_i + e_i$$

where

*ERROR<sub>y</sub>* = *ERROR1* or *ERROR2* as described above and in the appendix,

*X<sub>i</sub>* is housing characteristic *i*,

*a* and *b* are regression coefficients, and

*e<sub>i</sub>* is the regression error term.

The *i* housing characteristics are as follows:

*LOTF* = effective lot frontage;<sup>15</sup>

*LOTD* = effective lot depth;<sup>16</sup>

<sup>14</sup>Details on the calculation of the *ERROR* variables are contained in the appendix.

<sup>15</sup>In the case of irregular lots, "effective" lot frontage and depth are calculated from formulas based on lot shapes and sizes.

<sup>16</sup>Supra footnote 15.

<i>EXTER</i>	= exterior cladding: 0 if stucco or wood shingles, 1 if brick, vinyl, or aluminum;
<i>AGE</i>	= age of house;
<i>STRYS</i>	= number of storeys: 0 if one storey, 1 if two or more storeys;
<i>SQFT</i>	= square footage of house, excluding basement;
<i>BSQFT</i>	= square footage of basement;
<i>BTYPE</i>	= basement type: 0 if unfinished, 1 if finished;
<i>GARSP</i>	= number of garage spaces;
<i>SHED</i>	= shed: 0 if no, 1 if yes;
<i>POOL</i>	= swimming pool: 0 if no, 1 if yes;
<i>BDRMS</i>	= number of bedrooms;
<i>BTHMS</i>	= number of bathrooms (2 plumbing pieces or fewer count as 0.5);
<i>SEMI</i>	= semi-detached: 0 if no, 1 if yes;
<i>MULT</i>	= multidwelling: 0 if no, 1 if yes;
<i>PP</i>	= porch points: awarded by assessor, based on quality and structure; and
<i>CA</i>	= central air conditioning: 0 if no, 1 if yes.

## REGRESSION RESULTS

Tables 4 and 5 contain regression results for *ERROR1* and *ERROR2* in each of the six municipal areas. In every equation, the value of the adjusted  $R^2$  is low; and in five of the six municipal areas, it is lower for *ERROR2* than it is for *ERROR1*. The exception is Fort Erie, where the adjusted  $R^2$  is very low for both equations. The range for the adjusted  $R^2$  also narrows under market value assessment; for *ERROR1*, the adjusted  $R^2$  ranges from 0.0017 (Fort Erie) to 0.2316 (Lincoln 1), with five of the six values exceeding 0.1. For *ERROR2*, the range is more uniform, varying from 0.0362 (Fort Erie) to 0.0925 (Lincoln 1). This further confirms the ability of market value assessments to accurately reflect current market values. Leaving aside the one exceptionally low  $R^2$  (Fort Erie), current assessment practice typically accounts for about 78 to 90 percent of the variation in house values. Market value assessment raises this to a typical 90 to 95 percent. Finally, we note that our values for adjusted  $R^2$  in the market value assessment equations are generally even lower than in the comparable Winnipeg equations, indicating even less systemic bias in Niagara. Perhaps this is to be expected. Maintaining consistent intra-urban assessments may be more difficult in a larger city; in dispersed regional municipalities such as Niagara, the more serious problem may be consistent inter-urban assessments across local municipalities.

The significant coefficients vary across lower-tier municipalities, with no variable in either set of equations that is significant in more than three municipalities. This suggests that there are no housing characteristics that are consistently over- or underassessed across the region. Where several

coefficients for a variable are significant, their values often show some tendency to be of similar magnitude across municipalities.

The meaning of the significant coefficients is subject to several interpretations. At one extreme, assessment of different housing characteristics may be equal and consistent across the region, with errors resulting from different market values put on those characteristics in some municipalities. Alternatively, it may be the case that the market prices housing characteristics equally and consistently across the region but market value assessments do not. Combinations of these extremes are, of course, quite possible. Whatever the reason, significant coefficients indicate that the market and the property tax assessors are not similarly valuing housing characteristics. They emphasize the need to update assessments periodically, whatever the assessment system, to account for any alteration in the market's valuation of housing characteristics in each lower-tier municipality.

### CONCLUSIONS

In a geographically large and diverse regional municipality, made up of a number of lower-tier municipalities, there are many possibilities for significant inequities in property tax assessments. These inequities have the potential to affect both the property tax levy of the lower-tier municipality and that of the regional government. On the basis of our results, there is little doubt that market value assessment provides a more equitable basis for the taxation of class 0 residential property in Niagara, at both the level of the individual lower-tier municipality and the level of the region. Inter-urban equity is enhanced because the sum of market value assessments in a municipality more accurately reflects the sum of sales prices than does the current method of calculating total equalized assessment. Accordingly, the distribution of the region's tax levy using market value assessment more accurately reflects the distribution of true market values among municipalities. Intra-urban equity also is improved because, within each lower-tier municipality, the market value assessment of individual properties more accurately reflects their relative sales prices than do the current assessments.

Our conclusions result from a static analysis in which all data are drawn from one year. Maintaining the relative accuracy of market value assessment over time is likely to require periodic revisions, especially if the market changes its valuation of different housing characteristics or its locational preferences. Changing locational preferences may at times be an especially important influence on relative property values in the large regional municipalities that are so common in Ontario.

The decline in housing prices in Niagara, and elsewhere, during the recent recession raises the possibility of an additional source of inequities, which we have not considered. Falling property prices do not create inequities if the declines are proportional across properties and across lower-tier municipalities, for there is then no change in relative assessments. But there is no reason to assume that the declines are proportional.

Table 4 Regression Results: *ERRORI*

Variable	Fort Erie	Lincoln 1	Lincoln 3	Port Colborne	Pelham	West Lincoln
<i>LOTF</i> . . . . .	35.8	77.342*	49.201**	-76.391	72.557***	164.7***
<i>LOTD</i> . . . . .	5.8268	24.591	-13.859	33.844*	23.766**	14.967
<i>EXTER</i> . . . . .	43.754	334.46	7,594.5	2,097.3	-5,402.0	-6,845.8
<i>AGE</i> . . . . .	63.611	243.72***	284.53***	-148.87***	134.94	-30.555
<i>STRYS</i> . . . . .	12,269**	11,013.0***	9,462.7	12,312.0***	-130.51	16,074.0***
<i>SQFT</i> . . . . .	26,008***	-23,477***	-4,282.3	-18,765***	4,274.2	-34,592***
<i>BSQFT</i> . . . . .	-2,542.3	-2,773.4	-3,584***	-0,483.2	-43,713***	-23,488**
<i>BTYP</i> . . . . .	6,831.5	5,864.3	2,945.3	-491.94	10,794.0	1,893.6
<i>GARSP</i> . . . . .	1,740.6	-5,338.9***	-497.86	-2,641.4***	733.23	5,815.5**
<i>SHED</i> . . . . .	5,938.1	-2,712.2	-5,067.8	-2,392.9	9,218.7	1,785.5
<i>POOL</i> . . . . .	5,785.7	14,918.0***	14,874.0	-936.08	-256.44	5,383.9
<i>BDRMS</i> . . . . .	4,352.3	1,301.5	-6,911.4*	-1,733.7	-358.36	-3,089.4
<i>BTHMS</i> . . . . .	7,639.5	-937.08	10,614.0**	-4,241.6**	-1,506.0	-3,549.7
<i>SEMI</i> . . . . .	1,391.4	14,160.0**	3,461.5	8,280.5*	6,511.7	16,406.0
<i>MULT</i> . . . . .	-19,081.0	-3,037.0	-31,193.0*	-7,599.7	-29,768.0	-23,999.0
<i>PP</i> . . . . .	-223.9	273.54***	149.74	186.46***	-104.91	591.6***
<i>CA</i> . . . . .	-8,360.0	1,449.8	-112.31	3,817.3	1,019.8	8,285.9**
Constant . . . . .	-631.13***	11,337.0	-4,138.5	32,334.0	-9,482.8	36,058.0***
<i>R</i> <sup>2</sup> (adj.) . . . . .	0.0017	0.2316	0.1036	0.135	0.1034	0.2135

\* Significant at 1%. \*\* Significant at 2.5%. \*\*\* Significant at 5%.

Table 5 Regression Results: *ERROR2*

Variable	Fort Erie	Lincoln 1	Lincoln 3	Port Colborne	Pelham	West Lincoln
<i>LOTF</i> . . . . .	17.834	53.236*	-19.633	-85.071*	0.10481	11.166
<i>LOTD</i> . . . . .	13.097	-9.5287	-16.735	17.982	3.1153	34.742
<i>EXTER</i> . . . . .	-3,561.2	-2,154.5	2,456.9	1,321.7	-940.05	-18,142.0**
<i>AGE</i> . . . . .	28.79	33.091	96.547	88.957**	206.69**	-192.63**
<i>STRYS</i> . . . . .	-713.19	-1,374.1	7,071.4	-773.61	-5,676.8*	10,498.0**
<i>SQFT</i> . . . . .	-5.1292**	-5.7681	0.59233	-0.37591	6.2752***	-21.325**
<i>BSQFT</i> . . . . .	-9.0557**	5.7691	-17.971**	1.6997	-8.442***	9.4399
<i>BTYP</i> . . . . .	3,980.0	855.69	4,884.6	-6,240.3*	4,786.3	-4,654.5
<i>GARSP</i> . . . . .	1,276.4***	-1,513.0	2,344.5	-1,856.6*	1,611.5	4,385.4**
<i>SHED</i> . . . . .	1,423.5	2,521.3	-1,052.5	-4,507.3**	1,218.6	-8,374.6
<i>POOL</i> . . . . .	-905.35	10,022.0*	13,427.0***	-2,123.0	-1,244.2	-7,306.1
<i>BDRMS</i> . . . . .	1,129.7	5,092.7**	247.34	-323.72	2,349.2	-449.16
<i>BTHMS</i> . . . . .	2,850.6*	-5,029.2*	10,949.0**	-1,408.5	-358.88	1,757.6
<i>SEMI</i> . . . . .	328.03	6,904.0	509.46	4,605.3	27,180.0**	-2,198.0
<i>MULT</i> . . . . .	-7,652.0***	9,256.8	-23,120.0*	-3,168.3	470.46	13,287.0
<i>PP</i> . . . . .	-117.31***	178.94*	5,9349	30.333	-53.172	381.97**
<i>CA</i> . . . . .	2,147.8	-2,065.2	-3,012.3	-846.11	-954.21	890.75
Constant . . . . .	902.51	5,524.6	-20,054.0**	3,125.6	-20,302.0**	28,575.0**
<i>R</i> <sup>2</sup> (adj.) . . . . .	0.0362	0.0925	0.0857	0.0515	0.0408	0.0815

\* Significant at 1%. \*\* Significant at 2.5%. \*\*\* Significant at 5%.

Nor, as an alternative, can it be assumed that price reductions mirror any pattern of unequal price increases experienced in the past, for relative property values may not change symmetrically during periods of price increases and periods of price declines. As a consequence, new patterns of property tax inequities may arise as a result of declining housing prices. While this may not be a serious matter during short-lived price reductions, it becomes more problematic if any recovery is slow to develop. This possibility underscores the need for careful updating of any system of property assessment, including market value assessment, if equity is to be maintained.

## APPENDIX

The *ERROR* variables used in the estimating equations must be standardized to provide comparability among lower-tier municipalities because the ratio of assessment to market value differs across these municipalities. As a result, the size of the *ERROR* variables would differ across lower-tier municipalities and affect the size, although not the significance, of the regression coefficients. We remove this effect by calculating an adjustment factor sufficient to bring the average assessment in the municipality, current or MVA, up to the average sales price in the municipality. For *ERROR1*, for example, this factor is equal to the average current assessment divided by the average sales price. This factor is then applied to each individual property assessment in the municipality, creating a common basis for the comparison of current assessment errors across lower-tier municipalities. A similar adjustment is made for market value assessments in all lower-tier municipalities. *ERROR1* and *ERROR2* are therefore calculated for each property as follows:

$$ERROR1 = \text{Sales price} - \frac{\text{Current assessment}}{[\text{Average current assessment}/\text{Average sales price}]} \quad (1)$$

$$ERROR2 = \text{Sales price} - \frac{\text{MVA}}{[\text{Average MVA}/\text{Average sales price}]} \quad (2)$$

These *ERROR* variables are calculated for each property in each of the six lower-tier municipalities, and they serve as the dependent variables in the regression equations.